Mining CONGRESS JOURNAL

A NEW 30-TON MACK

for Big-Load Dump Work

• Introduction of Mack's new Model LRSW brings new standards of performance and capacity to super duty dump truck operations.

This big Mack packs its 30-ton payloads with unfaltering ease over the toughest of terrain. There's abundant power in its 275 h.p. supercharged diesel engine. Extra ruggedness in its massive all-welded frame. Positive traction at all times because of its Balanced Bogie and exclusive Power Divider which effectively transfers power to wheels having the most traction.

Mack's Duplex transmission provides 8 forward speeds in a single compact unit, with all ratios specially arranged for off-highway hauling. Safe and positive driving control is assured through such features as hydraulic power steering, air-assisted clutch, air-actuated brakes, easy turning radius and offset driver's seat.

All the way through Model LRSW is engineered for its own specialized job, built to move big yardage and do it profitably.

Find out how this new Mack dumper fits in with the demands of your excavating job. Call or write your nearest Mack branch or dealer.

Mack

since 1900, America's hardest-working truck

Mack Trucks, Inc., Empire State Building, New York 1, New York.
Factories at Allentown, Pa.; Plainfield, N. J.;
New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

Trucks for every purpose

6121

Mining Congress Journal

Contents

VOLUME 33, NUMBER 11 FOR NOVEMBER, 1947

JULIAN D. CONOVER
Editorial Director

JULIAN W. FEISS
Editor

Associate Editors
A. W. DICKINSON G. B. SOUTHWARD
H. L. MOFFETT

Production
B. C. WILKERSON

Advertising
P. D. MCMURRER, Mgr.
FRANK W. MORAN (*Chicago*) RALPH F. DUYSTERS (*New York City*)
RALPH W. HARKER (*Los Angeles and San Francisco*)

★ ★ ★

FRONT COVER: The Leonard, Tramway, and East Colusa Shafts of the Anaconda Copper Mining Co., Butte, Mont.—(*Photo courtesy Lester Bishop.*)

Page

EDITORIALS 15

MINERALS—WATCHDOG OF THE AMERICAN ECONOMY 16
By J. A. KRUG

THE MINERAL PROGRAM OF THE U. S. BUREAU OF MINES 19
By JAMES BOYD

MODERN METHODS REOPEN AN OLD PROPERTY 23
By H. W. MEADOR

TIMBER PRESERVATION—AN UNSUNG ALLY IN COAL MINING 33
By JOSEPH M. BRAY

HARD MATERIALS FOR ROCK BITS—Part I 38
By R. W. ADAMSON

DEVELOPMENTS OF CARBON CYANIDATION AT GETCHELL MINE, NEVADA 42
By ROYCE A. HARDY and F. W. MCQUISTON, JR.

COAL LOSSES IN WASHER REJECTS 44
By J. DICKERSON MARTIN

WHEELS OF GOVERNMENT 47

PERSONALS 49

NEWS AND VIEWS 51

MANUFACTURERS FORUM 62

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Copyright 1947, by

THE AMERICAN MINING CONGRESS
1102 RING BLDG., WASHINGTON 6, D. C.

HOWARD I. YOUNG, *President* DONALD A. CALLAHAN, *Vice President* LOUIS S. CATES, *Vice President* JAMES D. FRANCIS, *Vice President* JULIAN D. CONOVER, *Secretary*

Published Monthly. **Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.**

Member, Audit Bureau of Circulation

THE JEFFREY MANUFACTURING COMPANY

958-99 North Fourth Street, Columbus 16, Ohio

CUTTERS • DRILLS • LOCOMOTIVES • JIGS • FANS • UNDERGROUND CONVEYORS • CRUSHERS

233-40

Holes Drilled 10 Times Faster!

It took 73 minutes to drill 5 blast holes in coal with steel bits. Kennametal Bits, in same hand-held drill, do the job in 7½ minutes!

Easier Work for Skilled Men!

Holes are drilled with less manual effort because Kennametal Bits hold their keen edge—drill to desired depth without pulling out for bit changes.

Power Consumption Cut 90%!

Drilling holes 10 times faster saves 90% of the power formerly used . . . and proportionately reduces wear and tear on the drilling machine.

KENTUCKY MINE IMPROVES COAL PRODUCTION 5 WAYS

Tonnage Per Shot Increased 50%!

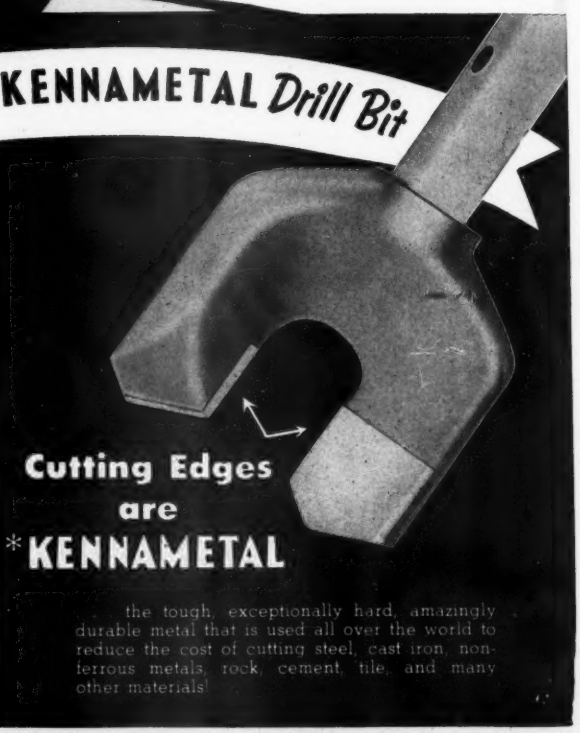
Blast holes are now drilled 7½ feet deep with Kennametal Bits, instead of 5 feet, which was the practical limit of steel bits. 50% deeper holes . . . approximately 50% more coal per shot.

Production Balanced!

Capacity use of all underground equipment is more nearly approached, as delays due to slow drilling are avoided.

By using this revolutionary **KENNAMETAL** *Drill Bit*

The service results summarized above, as recorded in a Johnson County, Kentucky mine, are being obtained in scores of other mines. Here's why—Kennametal Bits drill with greater ease, at faster speed, because their cutting edges are Kennametal*, the tool metal that is far harder and more durable than the hardest steel. There's only one way to prove what they can do for you—try them now. Our mining engineer in your district will be glad to demonstrate. Write us, giving details of your operation.



Cutting Edges are *KENNAMETAL

the tough, exceptionally hard, amazingly durable metal that is used all over the world to reduce the cost of cutting steel, cast iron, nonferrous metals, rock, cement, tile, and many other materials!

KENNAMETAL

MINING DIVISION

KENNAMETAL INC., LATROBE, PA., U. S. A.

How to cut Haulage Cost

. . . per Year

. . . per Mile

. . . per Ton

!

Use of EDISON Nickel-Iron-Alkaline Batteries in battery-operated locomotives and shuttle cars will help cut your haulage costs in several ways.

Perhaps most important, their unequaled dependability gives the closest approach to failure-free uninterrupted haulage it is possible to obtain. This is due partly to their steel cell construction which withstands rough usage, partly to their alkaline electrolyte which is a preservative of steel, and partly to their electrochemical principle of operation which is free from self-destructive reactions.

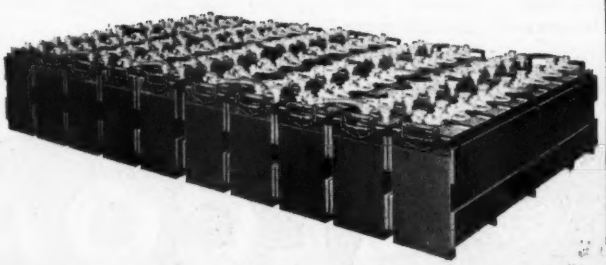
They do not require critical adjustment of charge rates, hence can be charged direct from the d-c power supply through relatively inexpensive resistors without need of motor-generators. They can be fully recharged in 6 to 7 hours and require no equalizing which helps get all charging done during off-peak periods.

Finally, they give much longer service life than other types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.* In Canada: *International Equipment Company, Limited, Montreal and Toronto.*

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



In Mine Locomotive and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

★ They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

★ They are **foolproof electrically;** are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.

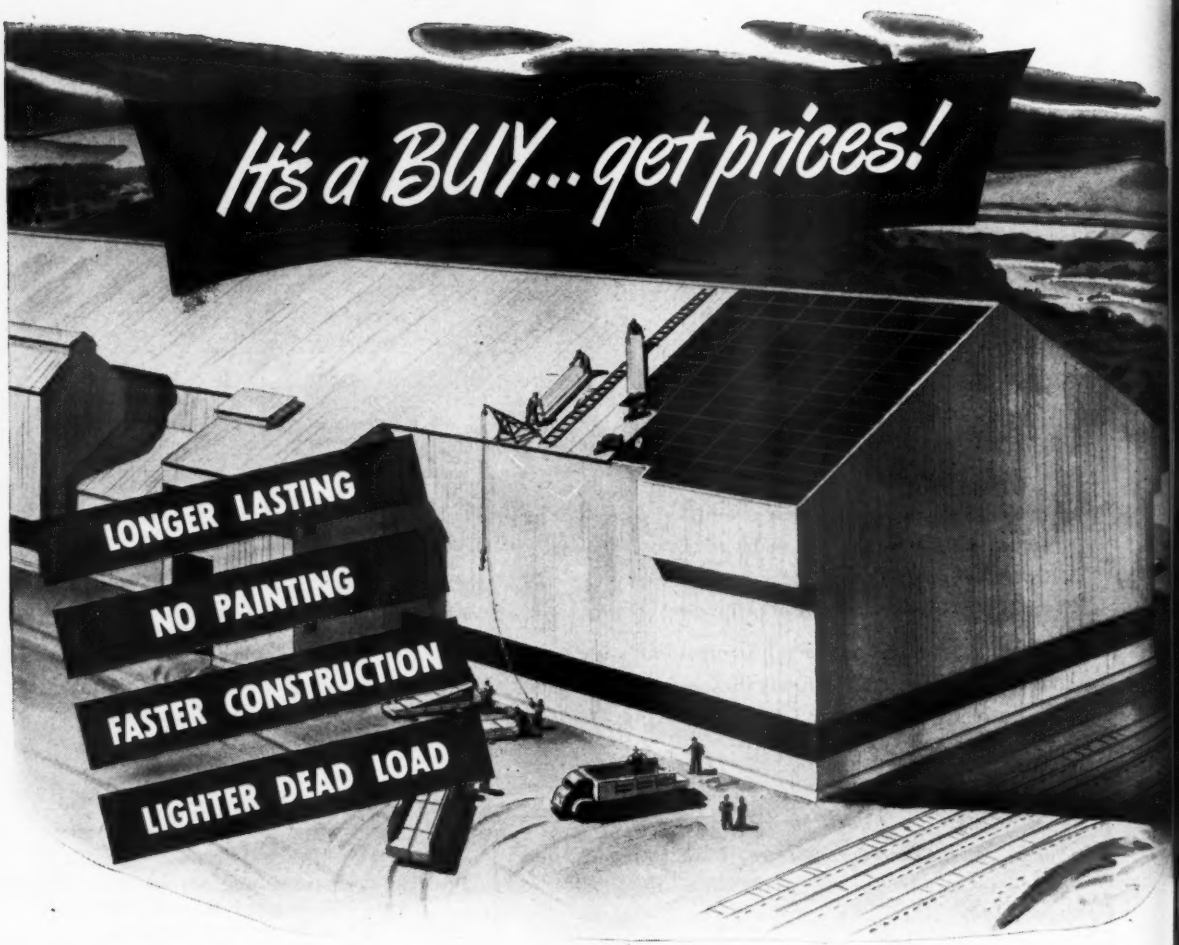
★ They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.

★ They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

★ They can **stand idle indefinitely** without injury, without attention, and without expense.

★ They are **simple and easy to maintain.**

Alcoa Aluminum INDUSTRIAL



Here's the answer to your needs for new roofing or siding that can be erected quickly at low cost. Thick, strong, corrugated Alcoa Aluminum. Engineer it now on your future buildings. *Compare Costs!* You're going to save some real money by using Alcoa Industrial Roofing and Siding. It is lower in price than any building material of comparable quality. And you will slash erection costs, too. Light in weight, aluminum goes up easier and faster. No loss from breakage.

The aluminum used in Alcoa Industrial Roofing and Siding is a tough, sturdy Alcoa Alloy that is unexcelled in resistance to atmospheric corrosion by any aluminum alloy now made. Can't rust, streak or stain adjoining surfaces. Withstands smoke and common industrial fumes. Properly engineered and installed, it does not require painting and will give years and years of trouble-free service.

Consult your roofing contractor.

WRITE FOR PRICES ALCOA ALUMINUM **ALCOA**

ROOFING and SIDING • • •

HERE ARE THE DETAILS

Thickness:

Lengths: 6, 7, 8, 9, 10, 11 and 12 feet.

Widths: Roofing sheet, 35 inches; Siding Sheet, Coverage 32 inches.

Corrugation: ¾ inch deep, 2.67 inches.

Weight: 1.68 lbs. per sq. ft.

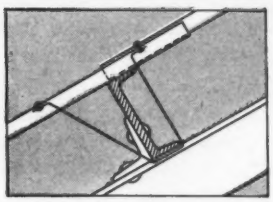
LOAD CARRYING CAPACITY

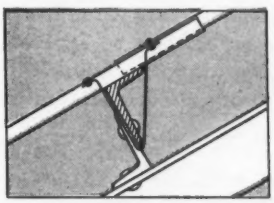
PURLIN SPACING	ALLOWABLE LOAD	DEFLECTION
4'5"	170#	Inches
5'0"	120#	25
5'6"	94#	35
6'0"	64#	41
6'6"	58#	50
7'0"	52#	63
7'6"	46#	80

QUICK APPLICATION

Illustrated here are two of the many ways of installing Alcoa Industrial Roofing Sheet.

STRAP FASTENERS CAN BE ADAPTED TO PRACTICALLY ANY TYPE OR ARRANGEMENT OF PURLINS.

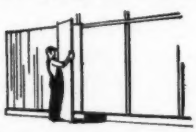




WITHSTANDS INDUSTRIAL SMOKE AND FUME

Alcoa Aluminum has been used for many years on coal mines, railroad terminals, warehouses, factory buildings and locomotive roundhouses. The protective qualities of Alcoa Roofing and Siding have been virtually unaffected by these severe conditions.

FOR SIDING THAT GOES UP FAST



Alcoa Industrial Siding has the same corrugation dimensions and lengths as Industrial Roofing. Over-all width is 33¾ inches covering 32 inches and providing extra economy for siding applications. Properly applied and with girt spacings up to 7'9" it will withstand 20 p.s.f. wind load.

ASK FOR COMPLETE INFORMATION

Pick up your telephone now and call your local Alcoa sales office. Ask for a sample and complete information on Alcoa Industrial Roofing and Siding Sheet. Or write to ALUMINUM COMPANY OF AMERICA, 1455 Gulf Bldg., Pittsburgh 19, Pa.

INDUSTRIAL ROOFING AND SIDING

STANDARD ENGINEERS NOTEBOOK

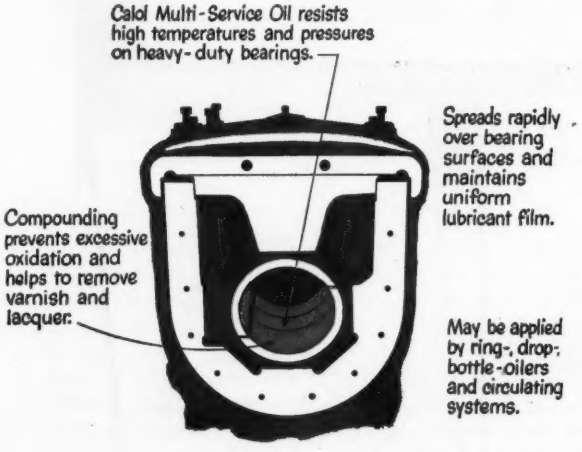
CALOL RPM

Multi-Service Oil efficient in tough service

Because it is made of high-quality stable oils and contains detergent and oxidation-resistant compounds, Calol Multi-Service Oil has decreased the amount of oil used in air compressors as much as 20% in some cases. It is also highly efficient in the lubrication of natural gas engines, industrial Diesel engines, vacuum and pressure pumps and enclosed reduction gears and their integral parts.

Calol Multi-Service Oil spreads rapidly on bearing surfaces, adheres tightly and withstands high temperatures and pressures. It comes in six viscosity grades: 45X, 50X, 55X (SAE 20), 65X (SAE 30), 75X (SAE 40) and 85X (SAE 50).

Where rapid separation from water is not required, Calol Multi-Service Oil may be applied satisfactorily by oil circulating systems. It is also applied by ring-, drop-, bottle-oilers and by hand oiling.


Calol Multi-Service Oil resists high temperatures and pressures on heavy-duty bearings.
Spreads rapidly over bearing surfaces and maintains uniform lubricant film.
Compounding prevents excessive oxidation and helps to remove varnish and lacquer.
May be applied by ring-, drop-, bottle-oilers and circulating systems.

Air Compressor Main Bearing.

This drawing prepared with cooperation of Chicago Pneumatic Tool Co.

Calol Pinion Grease is black, adhesive – flows slowly back after displacement by pressure.
Light grade is recommended for enclosed spur, and herringbone gears.
Comes in four high-viscosity grades.
Cushions shocks and reduces frictional losses caused by sliding action.

Section of Pinion and Girth Gears on Rotary Drier.

Calol Pinion Grease sticks on open gears

Because Calol Pinion Grease is extremely adhesive and flows back into place when displaced, it will not drip off and waste away from large open gears.

The tenacious lubricant film provided by this oil-like grease withstands high pressures and acts as a cushion under shock loads. It reduces to the minimum frictional losses caused by the sliding action of gear teeth and resists high temperatures.

The lightest grade, Calol Pinion Grease 0, is particularly adaptable to open gears operating at high speeds. It is also recommended for grease-lubricated enclosed gears where climatic temperatures are low.

Calol Pinion Grease is also used on wire rope. In this use, the application should be as light as possible.

It comes in four grades: 0, 1, 2 and 5. The heavier grades are increasingly more adhesive. In some cases they require heating for correct application.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

THIS DRIFTER DOES MORE OF THE WORK

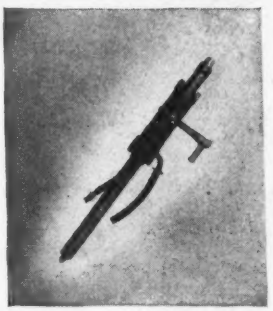
The New Blue Brute WPMS Drifter has the advantage of mechanical cranking. The light, shell-mounted Worthington Pneu-Motor is easily adjustable for proper feeding — to hold the machine to the rock and take up all the slack — without ever crowding the rotation.

Like the other new Blue Brute Drifters — WPM (Pneu-Motor on Drifter) and WHC (Hand Crank) — the WPMS comes in 3″, 3½″ and 4″ cylinder sizes, *with mountings standardized to take all three sizes.*

Like them, too, it will short-stroke under heavy loads, reducing stuck steels to a minimum. And its one-piece chuck sleeve lessens friction, holds the drill in better alignment and allows the piston to hit cleaner and harder.

HIGH EFFICIENCY AT LOW COST

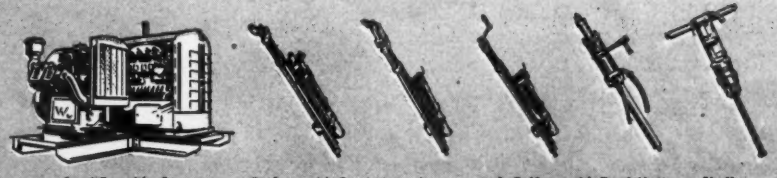
Fast, vibration-free drillers, easy and economical to operate, these ultra-modern Drifters are giving daily proof that *there's more worth in a Blue Brute* . . . Write for literature describing the complete line of Blue Brute Mining Equipment. HB.18



BLUE BRUTE STOPER

Self-Rotating Model WR-31 is well balanced, easily handled and has many other features that make it a favorite with mining men. Fully described in Bulletin H-1200-B30.

BUY BLUE BRUTES



Semi-Portable Compressors. Drifters with Feed Motor Incorporated. Drifters with Feed Motor on Shell. Hand-Crank Drifters. Stopers. Hand-Held Rock Drills.

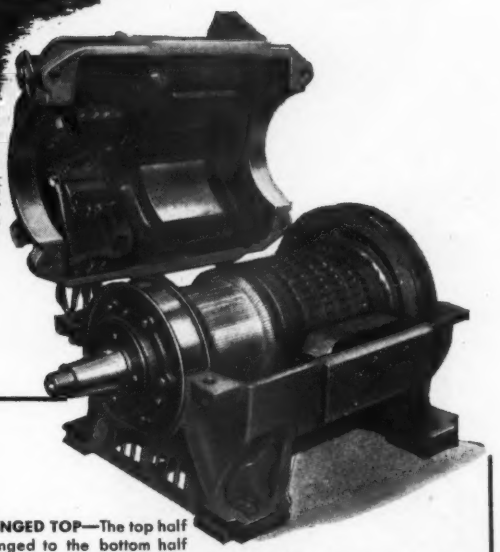
WORTHINGTON

Worthington Pump and Machinery Corporation. Worthington-Ransome Construction Equipment Division. Holyoke, Mass.

The Toughest G-E

Shovel Motor Ever Built

- Carries heavier loads safely
- Gives you more horsepower per frame
- Costs less to maintain



The new General Electric MD-600 shovel motor is the strongest, the best electrically balanced, and the most easily adapted shovel motor we have ever offered manufacturers and users of stripping shovels. Its new mechanical and electrical features will mean smoother shovel operation, less maintenance, and lower stripping costs.

The MD-600's frame is sturdier than that of any previous G-E design. The bearings are designed for a wider safety factor and greater capacity. Better commutations at all loads and speeds characterize this new motor. It is lighter and shorter and, most important, it gives you more horsepower per frame size, thanks to new design and insulating techniques.

The new MD-600 is one more good reason for specifying that your next stripping shovel be "General Electric equipped." Bulletin GEA-4654 gives all the details. It's yours for the asking. Write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

● **HINGED TOP**—The top half is hinged to the bottom half in frames 601 to 612 for easy inspection and repair of armature. Because of weight, heavier frames are split, but not hinged.

● **BEARINGS** — Single-width, solid cylindrical roller bearings are used in all sizes. All bearings are protected by dust-proof frameheads.

● **ARMATURE** — Low armature inertia (Wk^2) insures more horsepower output for the job. Lifting bails facilitate removal of the armature.

● **SHAFT**—The entire armature, with commutator, is assembled on a spider—a sleeve of seamless steel tubing or hollow-bored shafting—into which the shaft is pressed and keyed. Thus, the shaft can be pressed out without any disturbance to the commutator or winding.

● **FRAME**—Heavy cast-steel frame withstands severe service. It is equipped with lifting bails and with pads on both ends to mount a G-E brake.

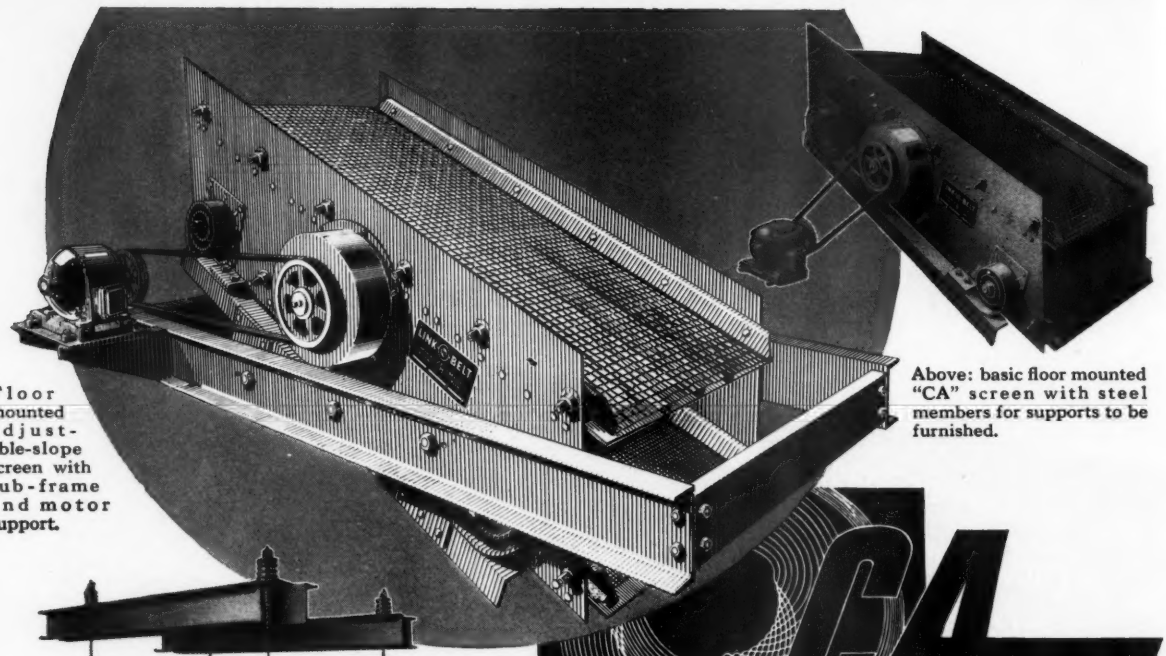
● **BRUSH HOLDERS** — Box-type brush holders are used. All brush-holder supports are doweled and bolted, and are in a fixed position for reversible operation. Easy-to-remove plates and hinged frame make cleaning and repairing of brushes quick jobs.

● **UNIVERSAL BEARING HOUSING**—Universal bearing housing accommodates all standard makes of roller bearings without special machining.

● **COILS**—All field coils are heavily insulated throughout with mica and glass. Armature coils are insulated with silicone-binder mica tape, with glass tape for over-all protection.

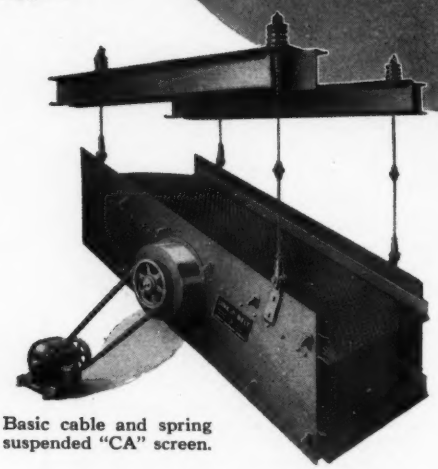
GENERAL ELECTRIC

65T-63

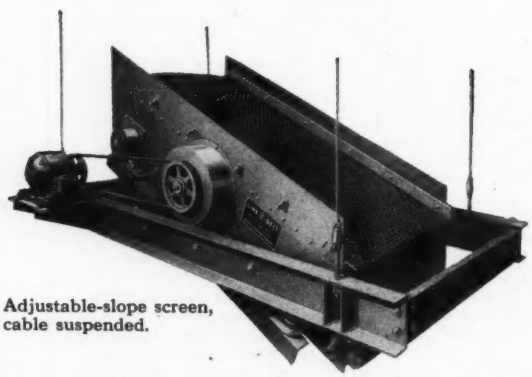


Floor mounted adjustable-slope screen with sub-frame and motor support.

Above: basic floor mounted "CA" screen with steel members for supports to be furnished.



Basic cable and spring suspended "CA" screen.



Adjustable-slope screen, cable suspended.

CONCENTRIC ACTION SCREEN

for extreme flexibility in mounting and suspension; high efficiency

Praise for the new Link-Belt "CA" Concentric Action Vibrating Screen continues to pile up. Mine operators are pleasantly surprised at its perfection of operation . . . its extreme smoothness in starting and stopping cycles. Overloads do not diminish its efficiency. "CA" high capacity is secured by greater amplitude at high speeds; unobstructed screening surface; true circle vibrating movement; controlled screen cloth tension. There is less abnormal vibration through critical ranges in starting and stopping. It is easily serviced and inspected.

As shown by the illustrations, the "CA" screen has extreme flexibility in mounting and suspension. If you are interested in higher screening efficiency and lower costs, write us for details. Send for Book No. 2154.

LINK-BELT COMPANY Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, San Francisco 24, Los Angeles 33, Toronto 8.

10.857-A

LINK-BELT Vibrating SCREENS

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Montana*

WEALTH OF MINERAL DEPOSITS
IMMENSE COAL RESERVES
LARGE LUMBER PRODUCTION
AVAILABLE WATER POWER
ABUNDANT LIVESTOCK
VALUABLE WOOL CLIP
VARIED AGRICULTURE
TREMENDOUS WHEAT YIELD
SCENIC BEAUTY

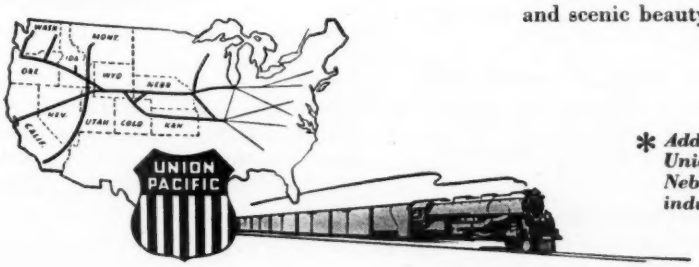
* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

Known as the "Treasure State," Montana is richly endowed with raw materials essential to industrial production. Among the many metallic minerals are silver, copper, lead, manganese, chromium and molybdenum. Coal reserves have been estimated at over 400 billion tons. The majority of the state's cities are supplied with natural gas.

Montana is a top producer of cattle and sheep, the annual sheep production being approximately two million head with a wool clip of great value. In agriculture, wheat takes first rank among grains. Sugar beets, potatoes, together with other vegetables, are grown on its farms. There are many thousand acres of forests, principally pine.

The Union Pacific Railroad serves Butte in the heart of the great mining area, and West Yellowstone—most popular rail entrance to the famous Yellowstone National Park.

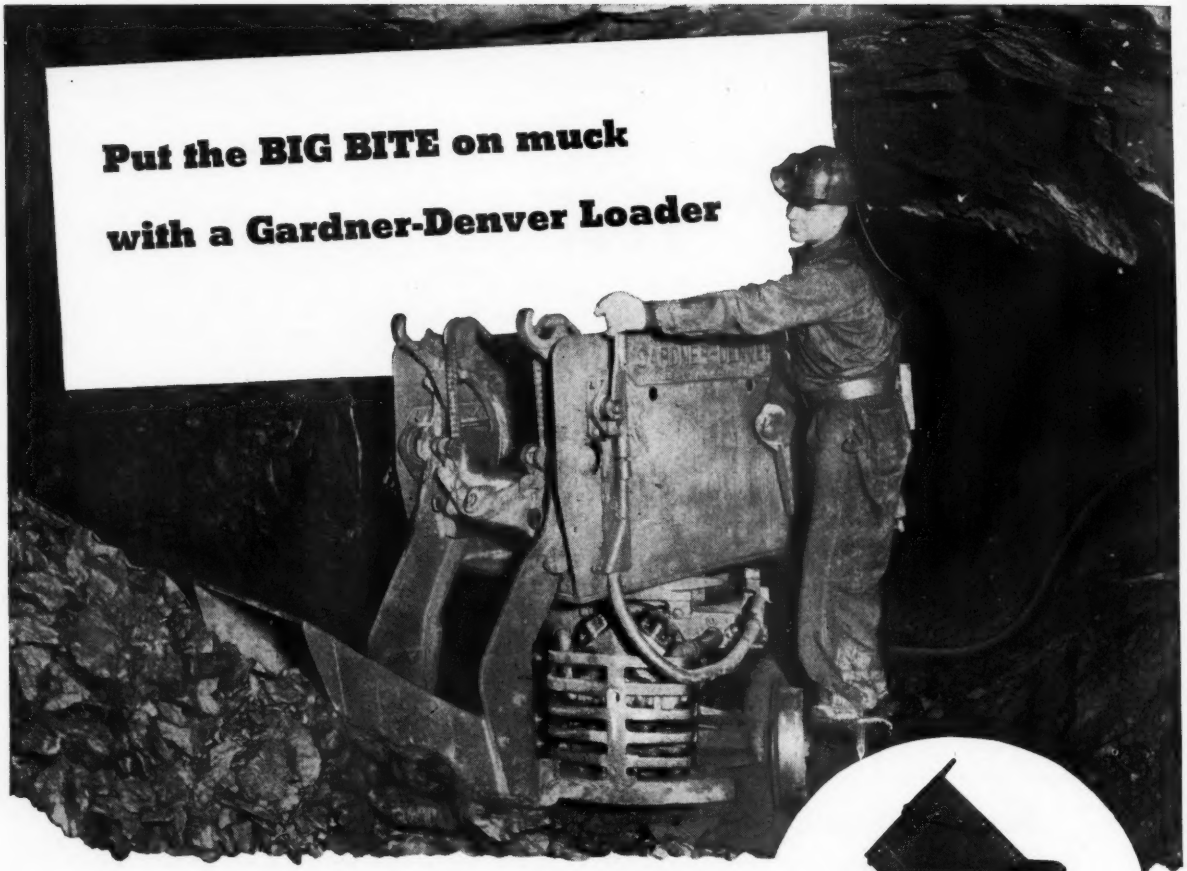
Montana welcomes new industry. It has the space, materials, facilities and manpower to encourage firms seeking new locations. Additional advantages are good living conditions, an excellent educational system and scenic beauty.



* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE



Gardner-Denver GD14 Loader

MORE TONNAGE! cars get loaded faster—tunnels are advanced quicker—with a Gardner-Denver GD14 Loader. That's because of the "big bite" principle which provides extra power for crowding the dipper into the muck pile and for discharging the load into the mine car. Two powerful 5-cylinder radial air motors—exclusively designed by Gardner-Denver—help to get your muck loaded in a hurry.

WIDER CLEAN-UP! With the wide clean-up range of the GD14, you load more muck in less time. Adjustable swing stops allow four digging positions on either or both sides. An automatic centering device locks the body of the loader on center so the dipper discharges directly into the car—minimizing spilling.

MORE SAFETY! The lower center of gravity on Gardner-Denver Mine Car Loaders protects operators—provides maximum stability of the loader on the track. There's a minimum of outside piping, too—an important additional safety feature.

MORE SIMPLICITY! Gardner-Denver Mine Car Loaders are simple in design. The shaft drive is through beveled gears to all four wheels, to give you every ounce of available power from the air motor. And this loader knocks down easily into complete sub-assemblies when necessary for moving through small shafts.

Gardner-Denver GD9 Loader

Write for Bulletins GD14 and GD9 giving complete information about Gardner-Denver Mine Car Loaders. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER SINCE 1859

Mining
CONGRESS JOURNAL

Published for the Entire Mining Industry by The American Mining Congress

JULIAN W. FEISS, Editor

Volume 33 NOVEMBER, 1947 Number 11

DANIEL HARRINGTON

ON May first of this coming year Dan Harrington, Chief of the Health and Safety Branch of the U. S. Bureau of Mines, will retire from Government service. Except for a short interval of two years, Harrington has been with the Bureau since November, 1914, and since 1926 he has devoted his entire career to mine safety and health—first as Chief Engineer of the Safety Division and since 1935 as Chief of the Health and Safety Branch.

We know of few public servants who have been of more value to the nation than Dan Harrington. We know of no public servant who has been of greater value to mining.

Dan's crusade for mine safety has borne fruit. We will never know exactly how many lives have been saved as result of his work—preventive measures can seldom be analyzed on a purely statistical basis. However, the decline during recent years in accident frequency in both metal and coal mines, as well as the universal recognition of the need for adequate ventilation and dust control, can be attributed largely to the guidance and energetic initiative of Dan Harrington.

Under his supervision the Bureau has established standards of safety and mining practice; pioneered in mine rescue methods and the development of new rescue equipment; trained thousands in first aid; and equally important, under Harrington the Health and Safety Branch of the U. S. Bureau of Mines has achieved world-wide recognition as the most authoritative source of information on mine accident prevention and industrial hygiene techniques. Realizing that safety underground cannot be attained by disciplinary measures exercised from a central authority, Harrington concentrated on education, research, and service. He never visualized his department as a police agency; he knew from long and bitter experience that mine safety cannot be achieved through orders from Washington.

Always direct in his thinking and acting Dan has never hesitated in speaking out where safety is involved. Miners, operators, and union leaders—all have felt the lash of his tongue. Dan has been a fighter, and like all good fighters, he has let the chips fall where they may. He has possibly made enemies but no man can ever question his ability, or more important, his integrity.

We will hear more from Dan Harrington and the mining industry suspects that his retirement will be a mere technicality—as far as mine safety is concerned. His successor has not been designated at the time of this writing, but the exacting standards of leadership and service set by Dan Harrington should serve as his guide. To the industry he leaves a rich heritage—his life's work in mine safety—"Monumentum Aere Perennius," a monument more enduring than bronze.

MECHANIZATION—THE KEY

ONE of the outstanding features of the A. M. C. Metal Mining Convention at El Paso was the increased interest shown in mine mechanization. Today, as never before, our Western mine operators are aware of the economy that results from the use of machinery underground.

In many instances the mechanizing of metal mines has presented complicated problems. The application of mechanical methods to older operations, many of which were developed years ago, can be extremely difficult. Were it possible for the operator to start from scratch, and if he knew the precise shape of his orebody, he could plan his mine layout and his mechanization program accordingly. Unfortunately, this situation seldom exists in our metal mines.

An example is the application of block caving methods, in which it has been axiomatic that nothing is cheaper than gravity. However, mechanization has disproved this axiom. Witness the case of certain large block caving operations in the West where slushing has replaced the grizzly system. The use of slushers has reduced cost through eliminating excessive secondary blasting; decreasing (and in some cases eliminating) excess haulage and grizzly level development; and increasing tonnage per man shift on the muck crew. Equally important has been the increased safety of operation that has resulted. However, if the mine has already been developed by grizzly, the change-over to slushers must be approached with caution.

It is often said that mining is a task for strong backs and weak minds; a statement which is obviously stupid and misleading. Today, with the increased use of mechanical equipment underground, the miner has become a highly skilled worker. Not only must he know the old arts of his trade but his knowledge must embrace the proper use of the latest drilling equipment and the technique of slushing, loading by machinery, timbering, and haulage. He must have a working knowledge of electricity, hydraulics, and explosives engineering. He must know safety practice, first aid, and ventilation.

The cult of the muck stick is disappearing from the mining industry. Today, as never before, mining presents a challenge to young men of intelligence and initiative. The door is open.

Secretary of the Interior Krug is greeted at the Welcoming Luncheon by H. M. Lavender of Phelps Dodge Corp., Chairman of the Western Division, AMC. Howard I. Young, President of the AMC, and Sr. Lic Eduardo Bustamante, Undersecretary of Public Finance of Mexico, and Guest Speaker, look on

MINERALS—Watchdog of the American Economy

Address of Secretary of the Interior J. A. Krug before the 1947 Metal Mining Convention of the American Mining Congress, at El Paso, Tex.

IT is a real privilege and a pleasure to participate in this joint meeting of mining men of the United States and Mexico. Here in El Paso we are at an international junction where the strength and intelligence of two nations are united instead of, as with so many other boundaries, separated.

Today the Western Hemisphere bears the brunt of the battle to uphold the freedom of all nations to determine their own destiny. Victory in that battle will come only if the nations on the helping end, those in this hemisphere, strengthen their own economies so they may operate at still higher levels of efficiency. While food and fuel are the immediate needs for the next few months, the long-term demand is for equipment and supplies which will rebuild industry, transportation and farm productivity. Some of these supplies can, and I hope will, come from Mexico.

I believe, as I said in my National Resources and Foreign Aid Report to the President last week, that foreign sources will be required in stockpiling certain materials in "serious" short supply. But overseas sources should not be relied on to the extent of letting up, even for one moment, in aggressively seeking domestic sources for all of our requirements. It is the continuing policy of the Department of the Interior to find the means of supporting a sound mineral economy for the United States. With the help of the minerals industry, we will pursue that policy with even greater vigor within the next few months.

Strong Mineral Economy Necessary to National Welfare

It is important to bear in mind that our resources are not alone in the physical raw materials which are available to us. They also comprise our manpower, our skills, our industrial know-how, and the impetus of a going, productive economy. The abundance of our natural resources would be of no avail had we not the current active knowledge in the minds of thousands of engineers, executives, foremen and miners, and the training, techniques and skills for extracting those resources efficiently from their resting place in the earth. Therefore, I believe it essential to the well-being

of our own country and our friends that we maintain a strong and healthy mineral economy. This can never be done if large segments of that industry are permitted to starve, become enfeebled and die.

I have searched for a comparison which best pictures the position of the minerals and metals industry in my country. I think it is that of a watchdog belonging to a careless, thoughtless family. When the family is in danger, the dog is combed and groomed and his diet is administered so as to keep him at the peak of efficiency. When the danger is passed, the family ignores him, neglects his appearance, forgets his meals and lets him forage for himself. I wonder at the carelessness of the family in letting the watchdog become weak and ineffective for an emergency, but I wonder still more at the ability of the guardian of the home to come back so quickly to the peak of fighting trim when the emergency occurs.

However, let us not push our luck too far. One day this faithful friend may not be able to come back.

But, metaphors, while occasionally amusing, do not enlighten. I should like to describe as briefly as I can some of the concrete proposals of the United States Government and the Interior Department to assist in maintenance of a strong, healthy, mineral economy.

The Minerals Advisory Council

Early in November, I shall announce the membership of a Minerals Advisory Council which will advise me on the solution of minerals problems confronting the Department of the Interior and which will help us to develop the background on which we can advise the President and the Congress in the further development of a sound national mineral policy. We must have a definite, comprehensive, coordinated policy and this we need at the earliest possible moment.

There are deposits of minerals in this country which might be lost forever because they cannot be profitably extracted at existing price levels. We must devise the best available method, within our means, to prevent the loss of these materials, for which we are the custodian, not only for our own country but for the rest of the world. If these materials will be lost through abandonment under present economic conditions, we must know that, and take definite action to prevent it, if possible. If competent investigations indicate that these materials may be recovered at a later date, we must then weigh the relative costs of differing times and methods of extraction, including the cost of permitting local communities and dependent business activities to die.

I am informed that our procurement of minerals for the strategic stockpiles is falling far short of the objectives that have been set. Domestic producers have not been able to meet both industrial demands and stockpile requirements, nor have foreign producers developed their production to the point of offering substantial quantities of many of these minerals. At the same time, a number of domestic marginal mines have shut down. Action is imperative to remedy this situation.

Mineral Sources for Stockpiling

Many persons advocate establishment of our stockpiles quickly, and primarily, from foreign sources. They argue that such purchases are net additions to our supplies, whereas domestically-produced materials constitute merely a transfer from underground to above ground reserves. Such purchases from abroad, they state, would supply dollar credits to foreign countries which are desperately short of dollars. It may be better, they say, for us to provide dollar credits in this way than to make donations or loans where there is little likelihood of return. They also assert that increased domestic production at present would strip an already short labor supply in the United States, whereas foreign purchases would decrease idleness abroad and help to place foreign economies on a more stable foundation.

While many of these arguments are sound, the advocates of this policy should realize that in instances where our potential domestic sources are adequate, the brunt of such a policy would fall primarily on the mining industry of the United States. The prime sufferers would, of course, be the marginal producers of strategic minerals. I have advocated this policy, therefore, only with respect to those materials for which no adequate domestic supply is available or can be developed.

There are others who advocate an acceleration of the stockpile program from domestic sources. Their viewpoint is bolstered by concern for the maintenance of a healthy, vigorous and going domestic mining industry with constantly advancing reserves, skills and technical knowledge. To the argument that known reserves should be left in the ground, they point out that it is common knowledge among mining men that mining districts die hard—additional reserves are commonly uncovered in the extraction of known reserves. Therefore, a program of encouraging production from domestic deposits would result in a net addition, in that new reserves would be found to replace, at least in part, the ores moved to stockpiles.

Marginal Mines and Subsidies

Various alternatives have been proposed to allow stockpiling from domestic sources, particularly from marginal mines. Since marginal mines cannot compete effectively in present-day markets, all of these plans involve Federal subsidies in one form or another. I did advocate, as a temporary expedient, a continuation of the old premium price plan. However, I feel that the President was justified in the veto of the bill that was placed on his desk. It was not equitable as

Small mines, such as this operation in Arizona, may become future large producers

among producers of the metals which the bill intended to benefit; it was unfortunately so phrased as to stimulate mostly the production of a metal which was in longest supply; and it failed to provide administrative flexibility or sufficient funds to carry out its objectives.

One of the subsidy plans now being discussed in Congress and among mining men provides basically that the Army-Navy Munitions Board should contract with individual operators of marginal deposits at higher than market prices and on a sufficiently long-term basis to enable the operators to recover their capital investment. It is said that this procedure would provide materials for stockpiles without diverting supplies from normal industrial markets. Its supporters also point out that the plan would yield quick results because it permits the Federal Government to concentrate its efforts on stimulation of the production of those minerals which are lagging most seriously in the stockpiling program.

Another proposal which has come to my attention is a subsidy plan on a sliding scale, with the subsidy granted in inverse proportion to the size of operations. The smaller the production, the larger the unit premium would be. This plan rests on the assumption that since most big mines were once small mines, it is in the public interest to sustain small, currently uneconomic mines which may become the large producers of the future.

In addition to subsidy plans there are suggestions for special tax treatment to encourage exploration and development and proposals for modification of regulations on issuance of securities by mining companies.

These proposals are the subject of constant study in the Interior, Treasury and Defense Departments. Merit or lack of merit can vary greatly with the specific detail of a plan. I think you can easily understand why the Interior Department cannot, alone, and in advance, commit itself for or against any generalized, non-specific proposal. However, the geologists, mining engineers and technical experts of my Department will be prepared to consult with the new Minerals Advisory Council and with committees of Congress which will be considering such plans in the coming year.

What Is Our Minerals Position?

I have said before, and I repeat again, that arriving at a sound national minerals policy is impossible when specific information is lacking. We do not know nearly enough about many of our most important mineral resources. I know it is impossible to take an "inventory," in the narrow, technical sense, of materials which we believe must exist in the ground but which have not been exposed to view. Nevertheless, we must make every effort to appraise the extent of our reserves so that national policy may conform to the facts. The search for this information is by no means new. The operations of both the Geological Survey and the Bureau of Mines are geared to the determination of those facts. However, at the present level of their activity it will be a long time before we can have a real conception of our mineral position. This activity must be accelerated. It can be with the full cooperation of industry.

In summary, I want to say again that it is the established basic policy of the Truman Administration to give every possible encouragement to the development and expansion of a sound and prosperous mineral industry in the United States, carried forward primarily through the initiative and enterprise of its citizens. To that end, the Administration will present to the Congress a dynamic minerals program, including, I expect, an accumulation of those programs of the U. S. Geological Survey and the U. S. Bureau of Mines which are essential to the assistance of private industry. Our country must be strong and Government and industry, I am sure, will gladly carry out our respective responsibilities.

The problems facing the industry need not dismay us. I am confident that the difficulties in building up a stockpile of strategic minerals and the exigencies confronting many branches of mining at present will be resolved. With the aid and advice of the representatives of industry who will constitute the Minerals Advisory Council, the Department of the Interior hopes to exercise an influential voice in the establishment and administration of a sound, comprehensive national minerals policy.

I have talked in some detail about the situation of the metal mining industry of the United States. I hope our friends from the metal mining industry of Mexico do not get the impression that our metal miners are afflicted with the boils of Job. Actually, we have in United States metal mining a progressive, energetic, forward-looking industry which is making an indispensable contribution to the maintenance of a high standard of living and security for our people. It is blessed with intelligent, vigorous leadership. I think I can assure our Mexican friends that the present leadership of the industry will keep it progressive and forward-looking.

The Yellow Pine mine at Stibnite, Idaho, an important source of antimony—a mineral as to which the U. S. was formerly considered a "have-not" nation

The Mineral Program of the U. S. Bureau of Mines

DR. JAMES BOYD

In His First Public Statement for the Mining Industry, Delivered at El Paso Before the American Mining Congress, Dr. James Boyd, Newly Appointed Director of the U. S. Bureau of Mines, Discusses the Need for a National Minerals Policy and How the Bureau Plans to Serve the Industry

I HAVE been asked to tell you of the mineral program of the Bureau of Mines and its sister agencies in the Department of the Interior for the coming year. If I were to follow standard procedure, I would list the various programs devoted to the mineral industries and list the appropriations of each of the bureaus. Then I would tell you how much the operating funds of each has been cut, and, in general, complain of the way we have been treated by the Congress. That, however, I have no intention of doing, for your support before the various Congressional committees has familiarized you with the Department's objectives and the monetary handicaps in fully attaining these objectives.

You know that as a result of the war and the indicated depletion of some of our mineral resources, substantial plans have been made to assist the mining industry in fully developing its resources so as to benefit the national economy. You know also that the last Congress felt that the expenditures of the Federal Government were too high and must be reduced. Consequently, together with many other programs, the appropriations of the Bureau of Mines and the Geological Survey were reduced substantially from those proposed by the President in his budget message, even though he already had cut the amounts which these bureaus requested. However, their work is far from crippled. The total appropriations in dollars exceed those that were available to both bureaus before the war. I will, therefore, not go into the details of the work carried on by these two bureaus in effectuating the Government's part in providing the mineral needs of our growing industrial economy. Rather, I propose to discuss broader aspects of the mineral problem.

When I assumed the directorship of the Bureau of Mines I immediately reviewed the bureau's many activities and its various programs because I believed that one of my duties was to see that they all fitted together in a consistent and comprehensive program. In making this review I looked for an accepted national mineral policy against which to weigh the work in progress, and to find a guide for plans to improve what was being done. I found an over-all policy lacking.

The Necessity of a National Minerals Policy

The Bureau, of course, operates under broad authority delegated by the Congresses. The organic act authorizes and makes it the duty of the Bureau of Mines to conduct inquiries and investigations concerning mining, with a view to increasing efficiency, safety, economic development and conservation; and to inquire into the economic conditions affecting these industries. Throughout the years, other laws have been enacted, with specific objectives in mind and these laws as a rule have contained sections that enunciate public policy. However, mineral policies have been evolved piece-meal. They are fragmentary, lacking cohesion and continuity. Large fields of activity remain virtually without guide posts. In other fields, contradictions exist. Still others are subject to varying interpretations. Not only the Bureau of Mines, but all other Government agencies whose functions are directly concerned with the mineral field, or impinge on this field, need a comprehensive national mineral policy. This need is becoming more and more urgent, not only for the operations of Government, but for the stability and progress of the mineral industry itself.

Now I do not come before you to advocate a specific national mineral policy, because that is clearly the prerogative of Congress. I believe, however, that the Bureau of Mines and the Geological Survey can be important advisers in Government service in aiding the Congress to acquaint itself with the many factors that must be weighed in its formulation of such a policy. I am also greatly encouraged by the willingness of the industry to consult with us and advise us, through an Industry Advisory Committee, which will meet early in December in Washington. I see in this Advisory Committee a channel by which the mining industry itself can present its problems effectively on policy matters.

The Bureau of Mines has been acting meanwhile, without such aid. Last spring, for example, the Geological Survey and the Bureau of Mines, in a presentation to the Public Lands Committee of the Senate, submitted a report on the mineral position of the United States. This report has now been published by that committee. The report resulted from much intensive study by virtually every interested member of both bureaus and after extensive discussions with members of the industry. It begins with several articles that provide background material; and it catalogues our mineral resources according to three main groups. The first consists of those minerals, such as tin, that have never been discovered in sufficient quantity in this country, or whose known deposits have been proved to be uneconomic under fore-

seeable conditions. These minerals always have been imported and as far as we can tell with our present knowledge, we shall have to continue to import them. It is necessary, then, that the Federal Government facilitate the importation of these materials to the extent that our domestic needs exceed our productive capacity. The second category contains those minerals, such as coal, that we have in abundance and which can be produced efficiently and plentifully to meet national and even export requirements. The third and last group includes those mineral commodities which we have in substantial amounts, but which in recent years we have not been able to produce in sufficient quantities to meet domestic demand. As a result, imports of such minerals have been necessary. Lead is an example. It is over the minerals in this group that most controversies arise.

To illustrate further the contribution of the Interior Department to the establishment of national policies, I might state that for the past two or three months a very large proportion of the efforts of the Washington staff of the Bureau of Mines has been engaged in preparing data required for the development of a satisfactory foreign rehabilitation program (popularly referred to as the Marshall plan). The complexities of the supply problem involved in this program are enormous. Careful attention has had to be given to all foreseeable contingencies. How much easier our task would have been had we had the benefit of an established and tested national mineral policy to guide us.

Congress Alone Can Establish Mineral Policy

As this problem has revolved in my mind during the very brief period that I have been Director of the Bureau, some very definite principles have taken form. First of all, as I have already stated, the policy must be established by Congress because in that way it will have the democratic authority of the whole people. And second, I wish to emphasize that a national mineral policy must be truly national, with a balanced consideration of every element—military security; a sound, prosperous domestic mining industry, with continuing reserves sustained by energetic prospecting; a growing industrial economy nurtured by an uninterrupted flow of raw materials reasonably priced; a fair distribution of the tax load; a fair share in the spending of the tax-collected funds so that all elements of the industry may participate; and, most certainly, the needs and interest of the consuming public.

I think it will be helpful in considering this question of policy to discuss very briefly a few of the many problems that must be integrated and guided by such a policy. An outstanding example is the problem of what should be done about marginal deposits. This involves the necessity of preventing marginal deposits in some areas from being lost to the nation and of preventing the loss of the supporting economy in some communities, as well as the loss of skills and impetus of productive enterprise. In considering this phase of the mineral policy it is necesary to recognize that subsidization in some form appears to be the most feasible solution. What form of subsidy—direct payments, tariff protection, tax benefits or other support—is best for the industry and reconcilable with the national interest? If the mining industry should recommend subsidies, it must recognize that other industries will look for the same type of support. The mining industry also must realize that subsidy inevitably opens the door to bureaucratic encroachment. Is subsidy the proper approach in our type of economy, and if it is how far do the disadvantages of subsidy become outweighed by considerations of security and preservation of our mineral economy?

Marginal Deposits and the Small Mine Operator

In discussing marginal deposits, some hold the erroneous concept that conservation means leaving the material in the ground. This concept definitely must be overcome. Those who understand the principles of the mining industry know that in many cases, once the workings from which these deposits may be extracted are abandoned, the marginal deposits may be lost, possibly forever. Certainly

At Butte, the Anaconda Copper Mining Co., has announced plans for large-scale mining of lower grade deposits

this is not true always for many mines have been abandoned for decades and successfully reopened when new technologies provide the economic conditions under which they can be successfully operated at a profit. Wise utilization and intelligent conservation of marginal deposits are one of the urgent mineral problems facing the nation's policy makers at the present. The means of solution are subject to wide differences of opinion in the executive and legislative branches of the Government and in the mining industry itself.

Then there is the problem of sustaining the little fellow—the prospector and the small miner, who have filled important roles in laying the foundation on which the mining industry could be brought to its present enormous size. Should a more extensive program of advice from Federal or state agencies be provided for him, so that his mining and extraction methods may be improved and his chances therefore of earning a decent living enhanced? Should he be aided by Government loans or subsidized directly or through the mechanism of the tariff? Although the small miner produces only a limited percentage of the total mineral output of the country, his function in the industry nevertheless is vital. He is rapidly becoming extinct partly because of changes in the basic economics of mineral discovery and extraction. What measures should be taken to improve his plight in order that he may more fully contribute to mineral discoveries?

Another perplexing problem is how should the mining industry conduct its operations so as to minimize unemployment in slack times and yet have adequate production capacity to meet peak demands? Although large capacity is an important element of strength from the standpoint of national defense, yet excess capacity can become a critical burden to operators and act as a depressing influence on their markets. Is this a matter of tax relief: If so to what extent and what form should such relief take? On the other hand, can the problem be handled by a flexible tariff arrangement similar to that accomplished by special legislation early this year when foreign copper was imported duty free to supplement capacity domestic production? Perhaps the stockpiling program offers a remedy through absorption of excess production in slack times.

The Problems of Stock Piling

The accumulation of stock piles, a task delegated to the Munitions Board, presents many difficult problems which must be considered at the policy level. As the stock pile is now progressing the Munitions Board has found it easier to accumulate those materials which might be termed as only marginally strategic, whereas those other materials which seem certain to be the most critical in the event of emergency currently have such enormous industrial demand that the board has accumulated little or none of them. This situation raises the question as to whether anything should be done to divert part of the current production to stockpiling so as to stimulate additional production from marginal ores even at costs in excess of current prices.

To some people the necessity of maintaining our own mineral industry conflicts with the need of the nation to reestablish a reasonable balance of international payments. Where excessive tariff barriers are involved, this position is tenable. However, I am not convinced that the mineral industry as a whole has enjoyed undue privileges. On the contrary, raw materials producers, it seems to me, have been at a disadvantage in relation to manufacturing industries. If increased American purchases abroad are essential to world trade and peace, those imports that may furnish competition for domestic products should be distributed fairly among the several classes of domestic producers and the mining industry should not be called upon to curtail its output disproportionately. It should be borne in mind that the mining industry faces competition from foreign commodities produced largely in colonial, low-wage areas of the world, whereas the manufacturing industries compete with foreign producers in more advanced industrial nations and thus must meet a much narrower wage differential. Further, I do not think it reasonable to expect the mining industry to be the sacrificial lambs in order to provide dollar credits for domestic producers of other classes of commodities. Because of our efficient production methods, however, most of the mineral materials which we have in abundant supply have never been faced with serious foreign competition. The areas of conflict, therefore, are dollarwise a very small proportion of our total mineral production and an even smaller proportion of the dollar value of the balance of payments. Therefore, it should not be difficult to develop a national policy that will steer between the Scylla of the destruction of our mineral producing industries and Charybdis of the failure of our international trade.

More Exploration and Development Needed

The nation's reliance on foreign sources for supplementary supplies of certain important domestic minerals can be minimized by a more intensive exploration and development program at home. It must be determined to what extent such work shall be carried on by public funds through public agencies. The Bureau of Mines and the Geological Survey have been deeply engaged in this type of work since passage of the Strategic Materials Act of 1939, and a number of successful projects, which have materially benefited both the mining industry and the American public, have resulted. For example, $20,000,000 worth of tungsten was recovered at a time when most needed in the war effort from a discovery made in central Idaho through the exploratory work of these Federal agencies. Other projects will reveal their full worth only when their discoveries, still in exploitation, have been worked out. Private enterprise, on its own or in cooperation with Government agencies, continues to be the mainstay of our efforts to maintain a discovery rate that will keep pace with our extraction rate. As examples, I may cite the announcement of the Ana-

"Then there is the problem of sustaining the little fellow—the prospector and the small miner. . . ."

conda Company of its intention to open up the lower grade deposits at Butte and the Magma Copper Company's proposed development of the San Manuel deposit in Arizona. These two deposits will extend the life of our developed copper reserves at the present rate of consumption by three and one-half years, or approximately equivalent to the amount of copper dug from our earth during the war to support the military efforts of our nation and her Allies. A report has recently come to me from the Bureau's field office which includes in its territory the great Coeur d'Alene mining region, that the Bunker Hill and Sullivan Mining and Concentrating Company, at Kellogg, Idaho, is preparing to mine and mill a very large tonnage of low-grade ore that has been left in the vicinity of the old stopes. It is stated that there are about 5,000,000 tons averaging approximately 3 per cent combined lead and zinc and ½ oz. silver to the ton.

Despite these recent noteworthy accomplishments, it is doubtful whether private enterprise, unaided, can maintain self sufficiency through its own exploration. If some aid to private enterprise is essential to an adequate exploration program, then how much aid is necessary and what form shall it take? Among mining men, there are advocates of all viewpoints. Some urge grubstaking and direct subsidies. Others would request only tax relief. Still others, small loans or more liberalized public lands regulations. On the other hand, there are many who feel that the job can best be done by a simple intensification of the prevailing methods, namely, by the efforts of both private enterprise where practicable and by Federal agencies such as the Bureau of Mines and the Geological Survey. It is not an easy task to justify to the Congress, particularly to those members of the National Legislature who come from non-mining states, the necessity of spending public funds for such work. It has been suggested at times that any public funds expended should be repaid to the public treasury, at least when commercial discoveries are made. In my opinion, all of these methods of attaining self sufficiency through exploration have merit. I should like to see a greater degree of coordination in such projects between private enterprise and Government agencies, both in financing and in guidance.

Coal belongs in the category of minerals which we have in abundance and which are available for export

Bureau Can Aid the Industry in Washington Matters

And now in closing I want to leave a thought with you as to the proper place for the Bureau of Mines in the Washington scheme of things. The Bureau is in an excellent position to make known the industry's needs. This does not mean that it is or intends to become a lobby for the industry. Its reputation for integrity, for adherence to facts and for a sincere concern for the public as a whole, gives it prestige in national councils; and this prestige is an asset to the industry which must not be impaired. With the cooperation of the industry it can offer leadership and maintains the position of being the impartial and dispassionate authority on mineral problems and, therefore, exercise the greatest influence when such problems are being considered. There will always be pressure from some quarters for the Bureau to throw its prestige behind some program merely for a short-term gain; however, I consider that the industry's real interests lie in having in Washington a well-informed agency to which all will turn with confidence. The mining industry has much to fear from ill-advised Government action, but I believe it has nothing to fear if the full truth is presented without bias when problems affecting it are under Government consideration.

The new Department of the Interior building at Washington, D. C.

The supervisory staff at the opening of the Taggart portal

Modern Methods Reopen An Old Property

The Glenbrook Mine of Stonega Coke and Coal Company Applies New Ideas to Reopen the Keokee Property That Was Closed Down 25 Years Ago

By H. W. MEADOR

Vice President
Stonega Coke and Coal Company

A NEW mining operation, designed for a capacity of 5,000 tons of coal per day has just gone into production—the Glenbrook Colliery of the Stonega Coke and Coal Company of Big Stone Gap, Va. This new development has two features of unusual interest, both of which are direct products of the modern trend of the coal industry—a record belt conveyor installation and the abolition of company houses, except for the members of the supervisory force.

The operation will mine at the start two seams of coal coming to one preparation plant (it is contemplated to mine other seams later); the Taggart seam which is at tipple height and the High Splint seam which is at an elevation of 1,300 ft. above the railroad. The unusual feature here is that the coal from the upper seam will be brought to the preparation plant by a belt conveyor—or rather a series of four conveyors in tandem with a total length of 4,000 ft. and a vertical drop of 1,200 ft. This is probably a record for outside belt transportation in coal mining. A second major item of interest is that the original "mining camp" built some years ago to serve this property has been completely torn down and replaced by a modern town with modern dwellings which are offered for sale to the company employes. This town, following the modern trend, is entirely separated from the mining plant at Glenbrook—by a distance of about three miles by county road.

History of the Property

The new operation is located at the head of Clover Fork in Harlan County, Ky., but the Stonega property extends across the line into Virginia. In fact, the first coal mine in this immediate field was opened in the early 1900's at Keokee, Va., which incidentally, is the site for the new town. The surface plant and underground equipment were thoroughly modern for that period; the Taggart seam was, and still is, noted for its high quality coal, but the mine had the disadvantage of being opened on the high side of the outcrop. This, however, was through necessity and not through choice because when the operation was first planned, there was

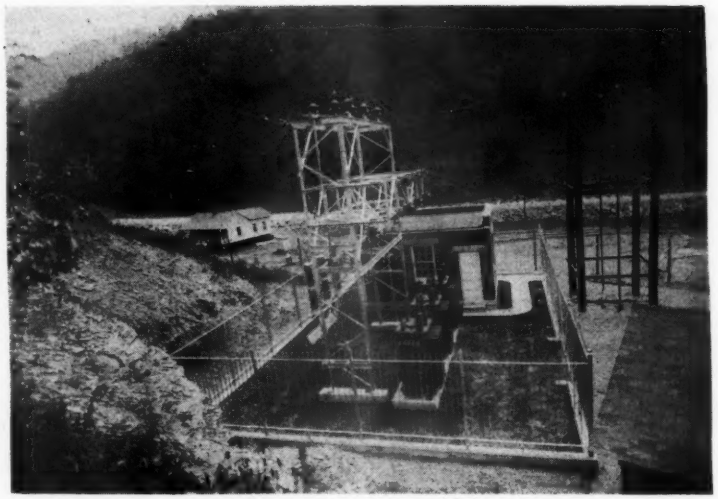
only one outlet for the coal—the Southern Railway on the Virginia side of Black Mountain. From this point, the seam dipped to the northwest outcropping on Clover Fork, Ky., but there was no railroad there and at that time, none was in prospect.

Keokee operated for a number of years, driving to the dip through the mountain to Clover Fork, but finally as the workings extended, the haulage became quite a serious disadvantage. This perhaps could have been overcome then, and certainly could today with modern haulage equipment, but a major consideration was that the greater portion of the future coal acreage lay in Kentucky where there was the ideal point for the mine openings. Here was a mining area with a life of 75 years—a large self-draining acreage of Taggart coal and an additional area of the High Splint seam which was not accessible from the Virginia side of the property. So the company logically decided that their best plan was to discontinue mining at Keokee until a railroad was available on Clover Fork. This decision was made about 25 years ago and since then the property has been idle until just recently, when the Louisville and Nashville Railroad began construction to extend a branch of its Harlan Division for a distance of 12 miles to reach the present site of Glenbrook. Keokee is now back on the map as a town—this time for keeps.

The Taggart Mine

The Taggart seam in this property has a height of about 4½ ft. with a drawslate that ranges from 8 to 18 in. It cannot yet be predicted exactly how this drawslate in this particular area will act when the seam is being mined, but from past experience in Keokee Mine, it is believed that the procedure in the Glenbrook operation will be to take the top for height in the entries but to hold it in the room panels. The mining system, as so far planned, will be by the conventional room and pillar methods which have been used successfully in making a high percentage of extraction in the other mines of the company working the Taggart seam in this field.

The entry development which is now underway is with Joy 8 BU's loading directly into mine cars; these, as furnished by Bethlehem Steel, have a four-ton level-full capacity. The seam is undercut by Jeffrey track-mounted bottom cutters and drilled with an electric hand drill; an eight-ton gathering locomotive serves each loading machine, delivering cars to a nearby side track where the trips will be taken to the outside by the main line haulage. Main line locomotives will be 13-ton Goodman's and as the length of the haulage increases and the production is raised to the point where large trips become necessary, the main line units will be two of the 13-ton locomotives in tandem.



Adequate power is provided

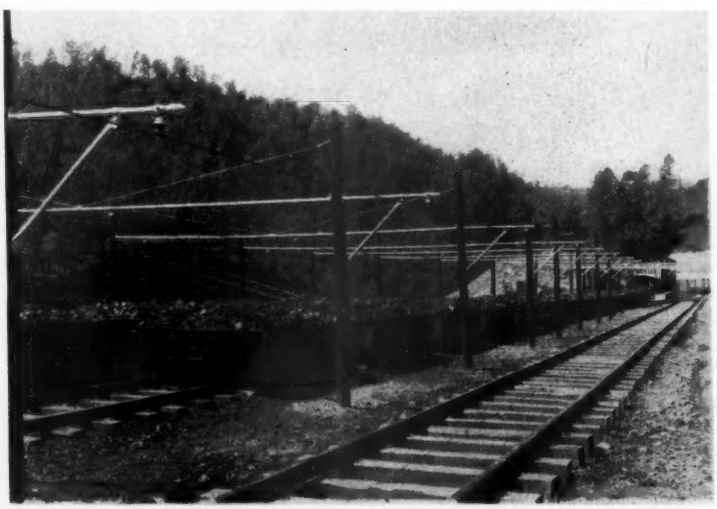
The Taggart Seam, being at tipple height, has a drift opening with a short outside tram road to a rotary dump in the tipple (see illustration). This dump handles one car at a time, discharging into a 20-ton bin from which an apron conveyor feeder loads onto a short belt—about 100 ft. long—that takes the coal to the shaking screens at the top of the preparation plant.

The High Splint Conveyor

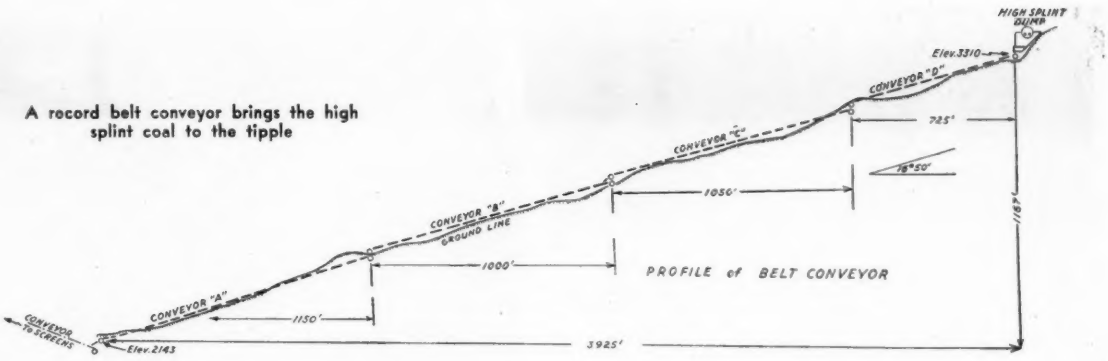
The High Splint seam outcrops at a sea level elevation of around 3,400 ft., which is about 1,200 ft. above the Taggart. It has a height of 6 ft.—clean coal. The mine projection for Glenbrook has not yet been completed in all its details. Opening this seam is to some extent pioneering, as it is not fully known just what all the conditions will be; although prospecting by outcrop has not indicated that any severe mining difficulties will be encountered.

However, a 6-ft. seam of clean coal will lend itself very well to any one of the several types of mechanical mining that have become more or less standardized, but in order to determine by actual operation what methods will be best suited to the conditions, the first development in the High Splint will be hand loading into mine cars.

The real feature of the Glenbrook plant is the belt conveyor which will bring coal from the High Splint seam to the preparation plant on the railroad, 1,300 ft. below. (See illustration.) The over-all dimensions of this installation, as previously mentioned, are unique in coal mining—a vertical height of 1,200 ft., and a



Tramroad from Taggart portal to tipple



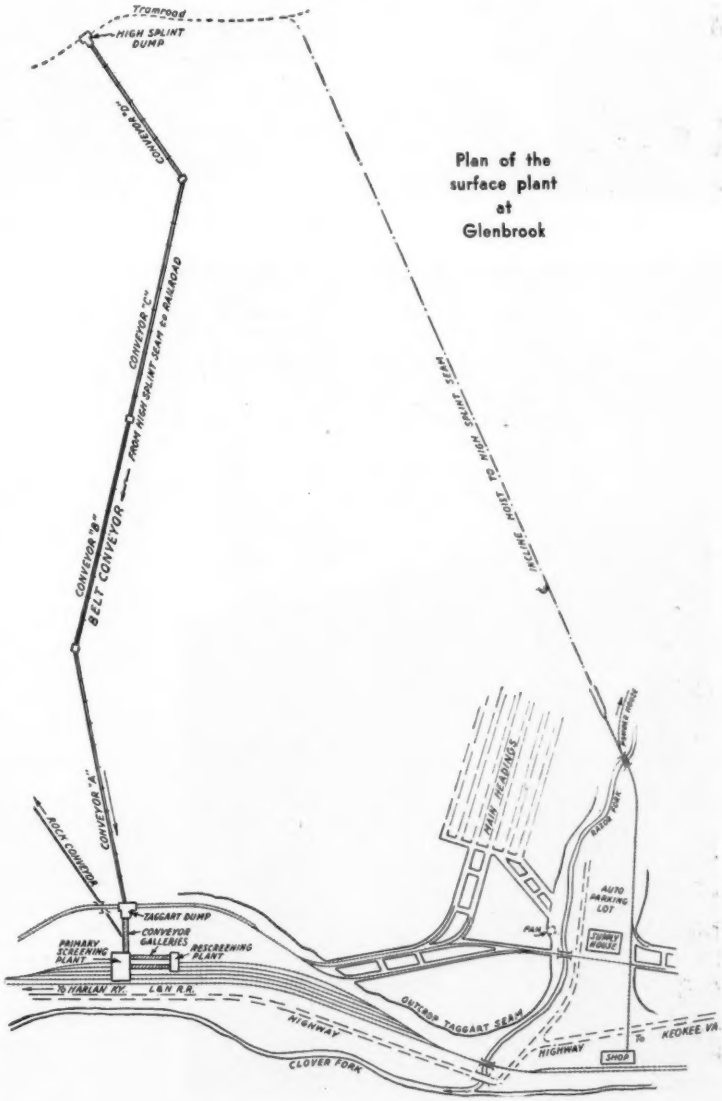
A record belt conveyor brings the high splint coal to the tipple

belt length of 4,000 ft., operating on a slope of 16° 50'. The conveyor is made up of four belt sections set in tandem but not in a straight line, as shown on the accompanying map. The irregular line was selected in order to fit the installation to the contours of the mountain and, as can be realized, quite a little engineering work was needed the find a site where a uniform grade of 16° 50' could be established for this vertical height and distance. The inequalities of the ground are compensated partly by grading and partly by trestles—all construction being of steel on concrete foundations.

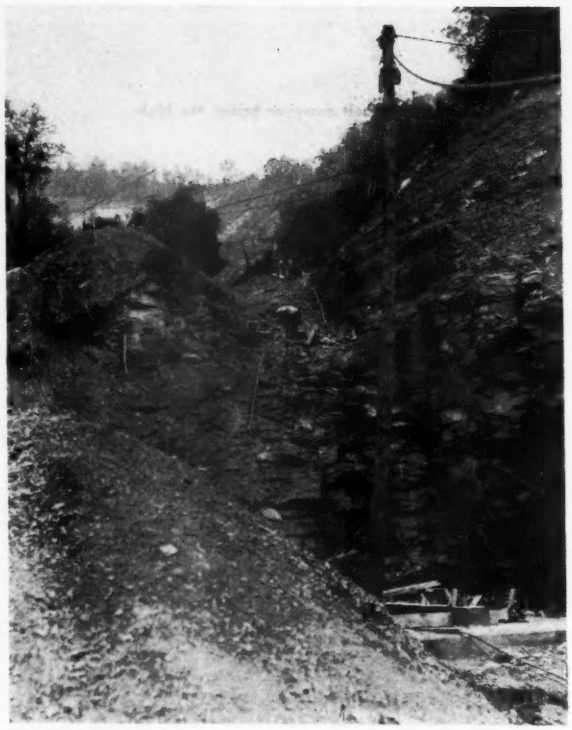
The mine is a drift opening with an outside tramroad 4,417 ft. long from the portal to the conveyor head-house. At the head-house, mine cars will dump into a bin by rotary dump from which an apron conveyor will serve as the belt feed, having a short steel chute to insure uniform central loading. The discharge from one belt to another is direct, with an open chute to guide the flow of coal from the head pulley into the conveyor line ahead. The belt will be 42 in. wide, with a capacity of 400 tons per hour, operating at a speed of 250 ft. per minute; at this speed, no trouble is anticipated from large lumps of coal on the belt rolling or sliding downhill.

Installing the Conveyor

The conveyor is a troughed type, furnished by Hewitt-Robins, Inc., set in a specially designed structural steel frame built by the Lackawanna Steel Co. This frame is in sections 54 ft. long, with expansion joints throughout its length; each section is self-contained with complete attachments for fastening the rollers and the idlers for the loaded and empty belt lines. This was, therefore, to quite a degree a prefabricated job, requiring only the connections between the frames to be made in the field erection. However, installing a 4,000-ft. conveyor line up a steep mountain is a real job even with pre-



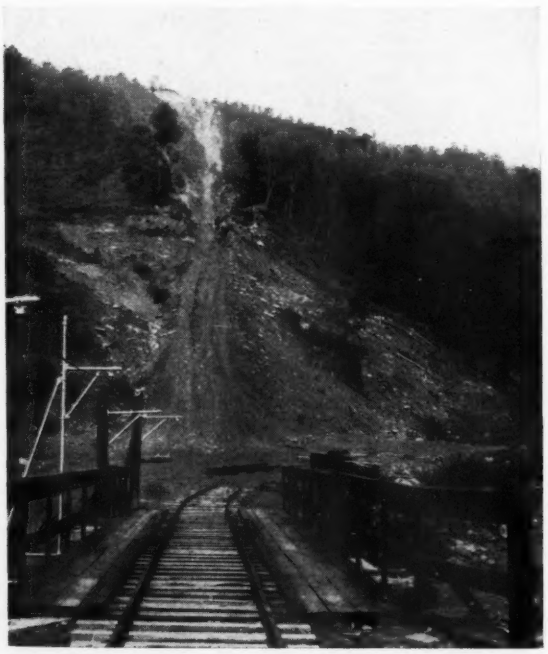
Plan of the surface plant at Glenbrook



High splint belt conveyor under construction

fabrication and the methods used here were well planned and well executed.

The structural steel sections are set on concrete foundation piers which were first completed before proceeding with the steel work. Then, starting at the foot of the conveyor, several of the frame sections were set in place and connected permanently, anchored on the concrete foundations, but omitting for the time being the belt rollers and idlers. Next, two 30-lb. steel rails were laid on top of the several sections already in place to form a track on which the next section to be installed was hauled up to its location, sliding on the rails; the haul being by diesel rope hoist. When the frame reached its position, it was bolted into place on its foundations, connected to the one behind already installed and the rails extended over its top. This sequence was continued, using the sections as installed for a haulage way to transport the subsequent frames up the mountain to their positions in the line.



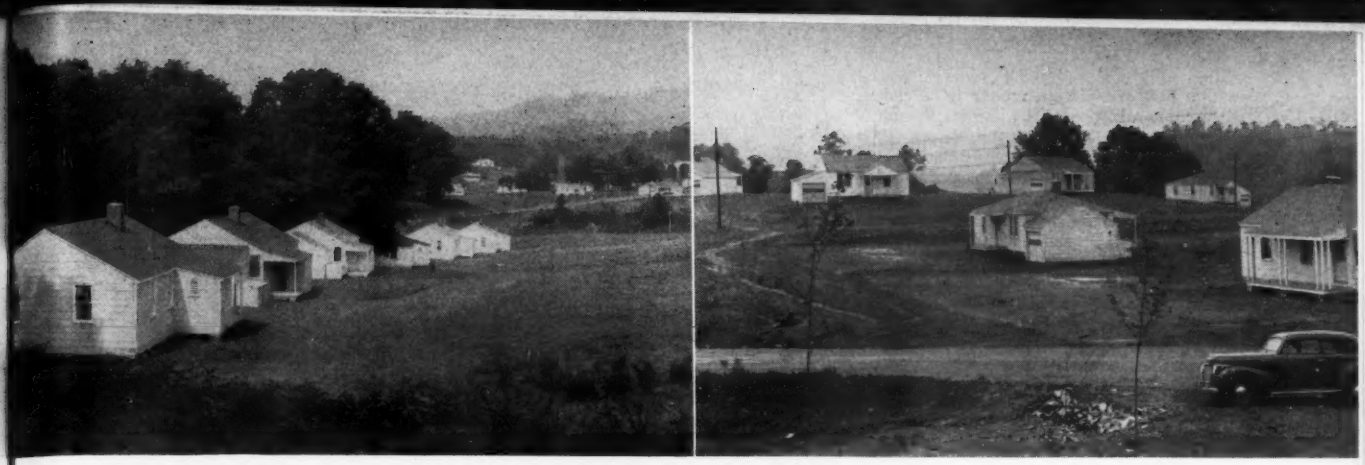
Incline hoist for men and supplies

As shown in the illustration, the fabricated sections, as unloaded from shipment, were stacked along the railroad track above the tipple. From here, they were hauled on a set of skids, by a tractor to the foot of the conveyor line.

Surface and Preparation Plant

The surface plant at Glenbrook contains all of the facilities necessary for the operation—mine portals, substation, screening plant, shops, supply houses, etc. This also is the main portal for the mine; it is reached by two county roads—one from Keokee, Va., and one from Harlan, Ky., and has adequate parking facilities for the employes' cars. The lay-out of the surface plant, including the railroad yard, mine tramroad, etc., is shown on the attached map, which also shows the line of the High Splint conveyor and also the hoist for men and supplies which is built up the mountain from Razor Fork.

Both the Taggart coal and the High Splint come to the same preparation plant which is a steel structure located on the railroad along Clover Fork. (See illustration.) For the present, there are no mechanical cleaning facilities although provision has been made in the design for such addition should it become necessary in the future. The preparation consists of screening by shakers and vibrators and the particular feature of



These attractive modern homes are owned by the employes

this plant is its ability to handle the coal from each seam either separately throughout the processes from the dump to the railroad cars or else combine and blend the products at any points between these two places. There are five loading tracks under the tipple with storage above and below the tipple for 100 loads and 100 empties.

As previously described, the Taggart coal dumps into a bin with a short conveyor leading to the top of the screening plant; the terminal of the High Splint conveyor is adjacent to this dump bin and from its discharge a belt conveyor, paralleling the Taggart, also leads to the top of the structure. (See illustration.) At this point there are two parallel sets of shaker screens which make the primary separation; these are equipped with picking tables for the larger sizes.

The products made at the primary separation can either be loaded directly into railroad cars or taken to the rescreening plant. This is built adjacent to the main tipple but about 165 ft. upstream; connection between the structures is by two parallel conveyors and a recirculating conveyor. The rescreening plant is equipped with vibrating screens to make the final sizing and to prepare any special products that the market may demand. Here again, as in the primary plant, the Taggart and the High Splint coals may be kept separate or may be blended in various combinations.

The Town of Keokee

One of the most important features of the new development is the rebuilding of the town of Keokee and it is a curious fact that for the second time in the history of the property, a model coal town has been constructed on this site. Mining was begun here about the turn of the century; modern (for that period) practices were followed in the equipment and operating methods and instead of the usual type of "company" house which was customary in the coal industry at that time, Keckee had attractive houses laid out to take advantage of the natural landscaping which Nature had provided here. In those days, it was really a show town.

However, that was a long time ago and many things of that day are now outmoded. Also, houses deteriorate and it often becomes more economical to replace them with new construction rather than to rehabilitate. This was the situation at Keokee when the new operation was planned. Accordingly, the old dwellings were torn down and on the original site there is now built a thoroughly up-to-date community

Interior views of the exhibit home

which has every appearance of a city suburban addition. As shown in the accompanying photographs, there is no suggestion of the old "mining camp." The houses are of different colors and of individual attractive designs, each having a half-acre or more of ground and reached by well-constructed driveways. (See illustration.) The community includes a store, grade school, high school, athletic field and a fully-equipped gymnasium.

The houses have either four or five rooms, each with all modern conveniences such as a complete interior bathroom, running water, electricity and a built-in garage. The four-room type has a living room, two bedrooms, a kitchen-dinette combination and a bath; the five-room type has three bedrooms. All are well built of best material—frame construction, indestructible shingle siding, concrete foundations, hardwood floors and insulation to insure maximum heat in the winter and coolness in the summer.

A state-approved water supply is from a dam on Clover Fork, having several million gallons capacity and a head of between 400 ft. and 500 ft. above Glenbrook. This will supply Keokee by a pipeline laid through the mine tunnel to a 500,000-gal. steel tank. The water system in Keokee includes adequate hydrants for fire protection.

A total of 80 dwellings have been constructed so far, which are offered for sale to company employes on easy time payments; an additional 20 houses have been constructed by the company for the supervisory force. A completely furnished home is on exhibit as a "sample" and already quite a number have been purchased. With plenty of open space between houses and with each individual lot large enough for a lawn, flower beds and a vegetable garden—the miners of Glenbrook have pleasant surroundings and healthful living conditions at a price which probably cannot be bettered anywhere in the coal industry. Located in the mountains of southwest Virginia and at an elevation of about 2,000 ft. above sea level, the climate of Keokee is ideal—cool summers and mild southern winters.

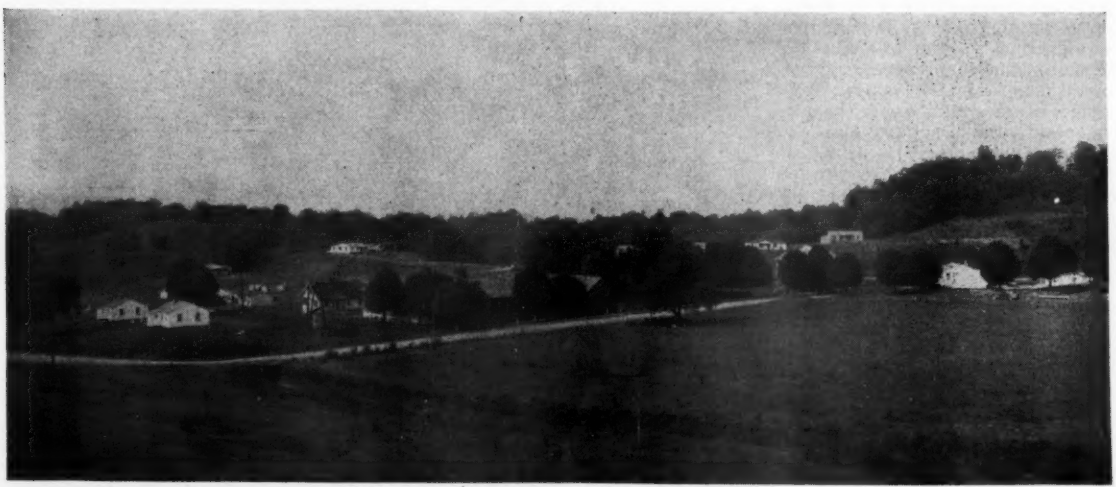
Above—The screening plant at Glenbrook

Left—Conveyors from dump bins to screens

Engineering and Construction

Construction at Glenbrook was started in 1946 and the first car of coal for shipment was loaded on May 23, 1947. This was from the Taggart seam. At that time the plant was still under construction; excellent progress was made in the succeeding months and it is anticipated that the entire installation for both the Taggart and High Splint mines will be completed by the end of this year.

The general plans for the surface lay-out, as well as the designs for the tipple, conveyor and screening plant, were made by Allen & Garcia, Chicago, Ill., who also have charge of the field erection of these structures. Eavenson & Auchmuty of Pittsburgh, Pa., were employed as consultants for the preliminary plans. All work was under the direction of our operating and technical staff, with M. W. Summers, Chief Engineer, and C. H. Hagy, Superintendent of Glenbrook, in charge of the field work.



Keokee is a mining town with ideal living conditions

the new rotary feed motor of CP ROTORdrifter

High drilling speed, powerful rotation, air economy, and *minimum maintenance* have long been characteristic of CP drifters.

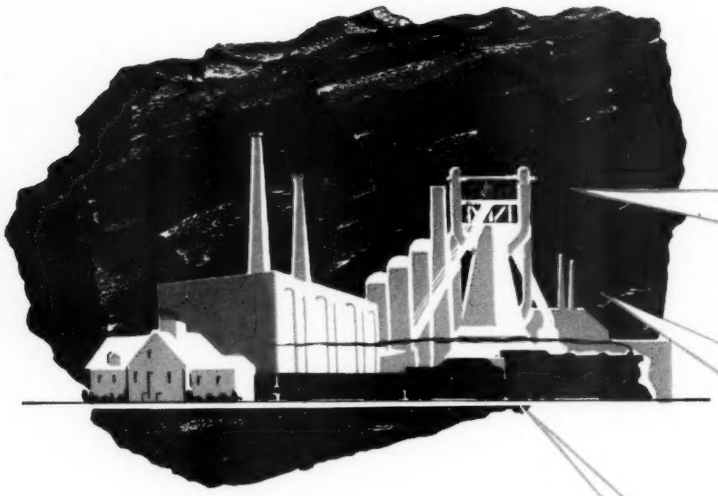
Now Chicago Pneumatic offers another basic improvement – a vane type, rotary motor, *built into the drill,* to provide a still more efficient feed.

This permits drill construction with many additional advantages: overall length is shortened . . . weight is reduced . . . only a single air hose is required . . . both drill and feed controls are located together in the backhead . . . the drill has exceptionally good balance . . . smoother operation is secured, with lessened vibration . . . there is a minimum number of working parts . . . and the upkeep is exceptionally low.

CP ROTORdrifters are furnished in two sizes: CP-50 N of 3″ cylinder bore; CP-60 N of 3½″ cylinder bore. Consult your nearest CP Branch Office for further information.

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



No need to compromise–

WHATEVER THE SIZE-RANGE OR SPECIFICATION, CYANAMID CAN NOW SUPPLY A PROCESS FOR EFFICIENT COAL PREPARATION

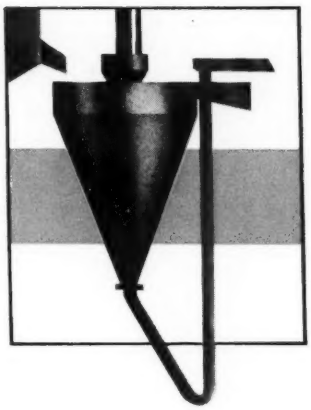
Coarse lump, intermediate or fine coal ...metallurgical, steam or home-heating coal . . . whatever the raw coal you must convert to specification fuel, Cyanamid can now supply the preparation process for optimum results at low operating and low capital cost.

No need to compromise. Fit the cleaning process to your coal and its markets. With a process to fit every need and no self-interest in equipment manufacture or plant construction, Cyanamid offers unprejudiced counsel based on the results of carload tests of your coal by various preparation processes in the Cyanamid Mineral Dressing Laboratory at Stamford, Connecticut.

We invite discussion and stand ready to run carload tests on your coal; to help engineers of your choice design the most efficient separation unit into your cleaning plant, and to provide the practical assistance of Cyanamid Field Engineers in tuning up the installation.

AMERICAN CYANAMID COMPANY

HEAVY-MEDIA SEPARATION



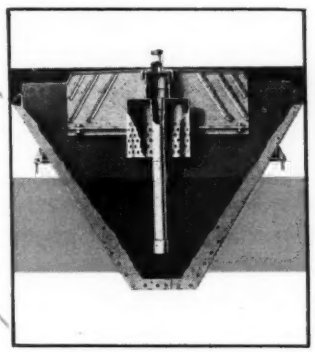
Precision cleaning over a full-size range with inherent advantages over previous preparation methods in cleaning coal with a high-percentage of near-gravity material. Extremely accurate on coal with a high and variable percentage of refuse. Functions efficiently at any desired gravity from 1.25 to 3.40 (within ± 0.01) with gravity quickly and easily adjustable as feed coal changes.

After 1½ years of satisfactory operation, one Heavy-Media Separation plant being relocated and capacity being substantially increased. Two large bituminous plants now nearing completion; a third being designed for the world's largest single-unit metallurgical-coal preparation plant, and an anthracite plant being designed for 1948 operation.

DUTCH STATE MINES CYCLONE

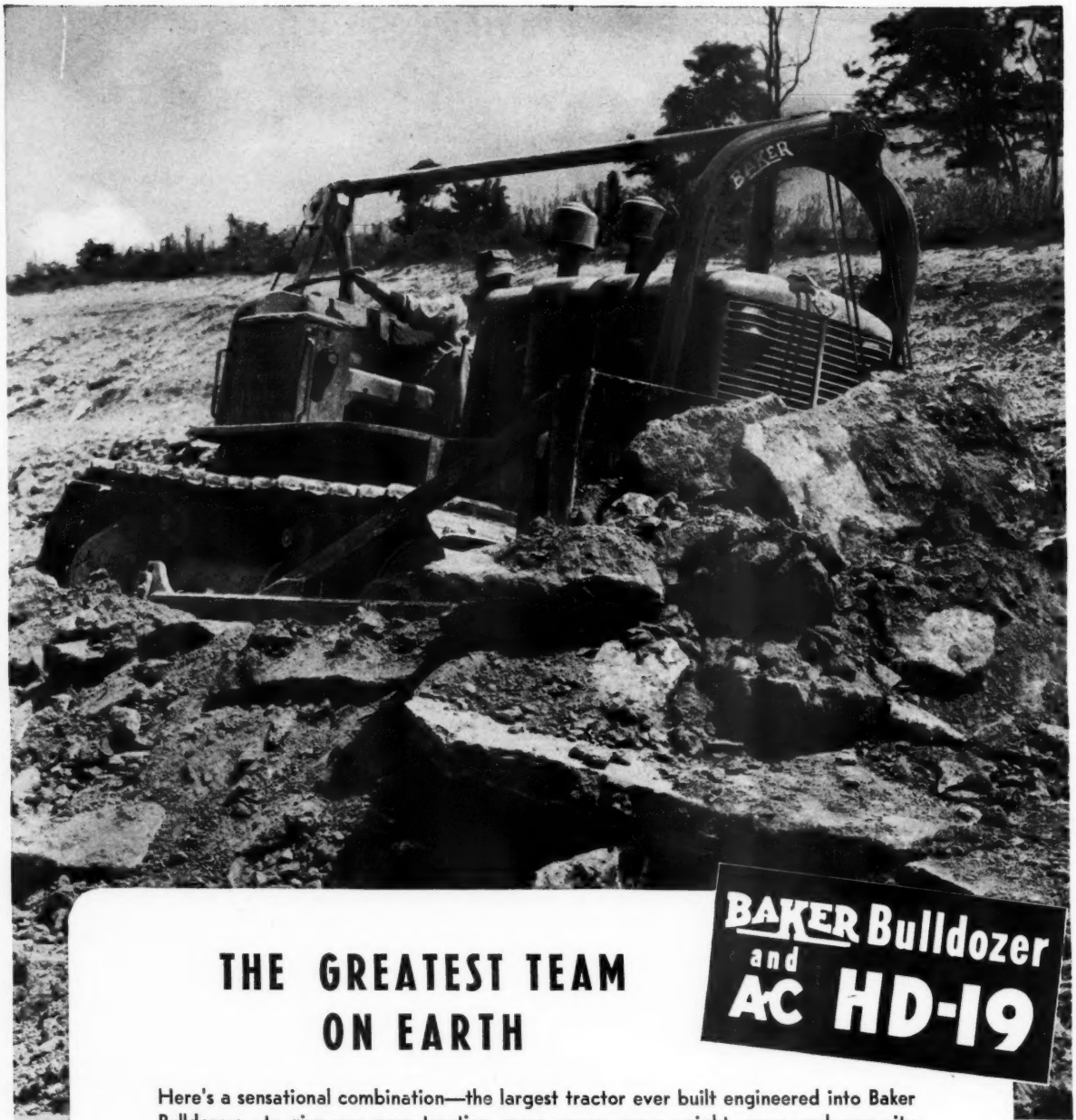
Alone or in conjunction with Heavy-Media Separation, provides amazingly accurate and economical cleaning in the ¼" x 0 range on either anthracite or bituminous. Can be used with autogenous or exogenous medium. Commercial size, continuous-unit "cyclone" for testing carload lots now in operation at the Cyanamid Mineral Dressing Laboratory for determining the applicability of Dutch State Mines techniques to your coal.

FROTH FLOTATION



Low-cost method of preparing anthracite and bituminous in the 28 x 200 size range. Two types available: Steffensen (Free Air) and Fagergren (Mechanical). One plant now in operation on anthracite and a second now under construction. Worthy of study, particularly as a method of profitably recovering fine sizes and simultaneously lessening stream pollution.

30 Rockefeller Plaza, New York 20, N. Y.



THE GREATEST TEAM ON EARTH

BAKER Bulldozer and AC HD-19

Here's a sensational combination—the largest tractor ever built engineered into Baker Bulldozers—to give you more traction, more power, more weight, more work capacity than ever before.

The HD-19 Baker Bulldozer with Torque Converter Drive provides unlimited operating speeds with a minimum of gear shifting—operating speeds that are automatically geared to load conditions for maximum efficiency. Over 48,000 pounds of weight provide "slip-proof" traction in all weather and ground conditions.

Again Baker sets the pace with both cable and hydraulic Bulldozers and Gradebuilders, each specifically engineered into the Allis-Chalmers HD-19. If it's low cost yardage—smashing power—continuous operation you're after, tackle your next job with an HD-19 and Baker 'Dozer—it's the greatest team on earth.

BAKER They Go Together! AC

Baker Mfg. Co., Springfield, Illinois

TIMBER PRESERVATION— An Unsung Ally in Coal Mining

With the Mounting Costs of Labor and Material, the Use of Treated Timber Underground to Eliminate Replacements Is Fast Becoming an Economic Necessity in Coal Mining

By JOSEPH M. BRAY

Mining Engineer
Osmose Wood Preserving Company of America, Inc.

THE question of treating mine timbers against decay has become a subject of ever-increasing importance among coal operators, and a strong trend is now under way to adopt the use of treated timbers and ties as a standard operational procedure. The industry has been shown in past years that timber preservation is a sound, economical procedure. Relatively little on an industry-wide scale in this country was done about the matter, however, until about the past 10 years, although German coal companies have been for many decades very successful in using timber preservatives (mainly those with sodium fluoride base).

Since the end of World War II timber treating among American coal companies has graduated from the rank of an interesting subject to that of an economic necessity in the struggle against rising mining costs. This fact will be brought acutely into focus when the coal market becomes normally competitive and men must be released from costly, unproductive maintenance to more productive tasks.

Historical Background

Wood has probably been the most-used material in the history of man, because of its variety, abundance, relative ubiquity, and its great mechanical strength, its remarkable adaptability to cutting and shaping, and its excellent appearance in finished form. As old as man's use of wood has been the problem of its deterioration, mainly by decay and insect attack. This created little concern until the latter part of the last century, because wood had been available in seemingly-boundless quantities.

The advent of railroads, electrical power transmission, and the telephone and telegraph created a need for astronomical numbers of poles, cross ties, and structural timbers. The life of these woods had to be greater than normal because of the "permanent" nature of the enterprises. Use was made of woods naturally most resistant to decay, but more important was the fact that the new, large industry of scientific wood-preservation by chemical means was developed.

We are all familiar with creosoted railroad ties and utility poles. Some railroad ties have given more than 50 years of service, with many more years of useful life remaining. Without preservative treatment, these ties would doubtless already have been replaced as many as ten times. Numerous other illustrations of economy through use of treated material could be given. Creosote possesses certain properties that render its use underground somewhat undesirable and a number of other treatments using chemical salts have been introduced and successfully service-tested. Constant research is improving not only materials for wood preservation but also the methods of applying these preservatives.

The importance of timber in coal mining is axiomatic. Timber consumption in the bituminous industry at the present mining capacity of about 600,000,000 tons per year is, according to studies by the writer, at the rate of 2,500,000,000 board feet (208,333,000 cu. ft.) per year. This is equivalent to a length of 56,400 miles of timber 10 in. x 10 in. in cross section—more than enough to twice girdle the globe at the equator!

Osmose treated timbers after several years' service

General Remarks on Wood

Any tree trunk is divided into the following features, beginning from outside toward the center: The thick outer bark (corky and dead), the thin

Extract of paper presented September 9, 1947, to the Monongohela Valley Coal Mining Institute, Morgantown, W. Va.

inner bark (living), the sapwood, the heartwood and the pith. These all vary in relative thickness and other properties. Between the bark and the wood is a microscopic layer called the cambium, where all growth in thickness and length takes place.

Trees are divided broadly into hardwoods and softwoods, which division is not based on actual hardness. The hardwoods comprise the broad-leaved group, and the softwoods comprise the coniferous group. The cellular structure, proportions of sapwood and heartwood, and other properties vary with species, climate, geographic position and numerous other influences.

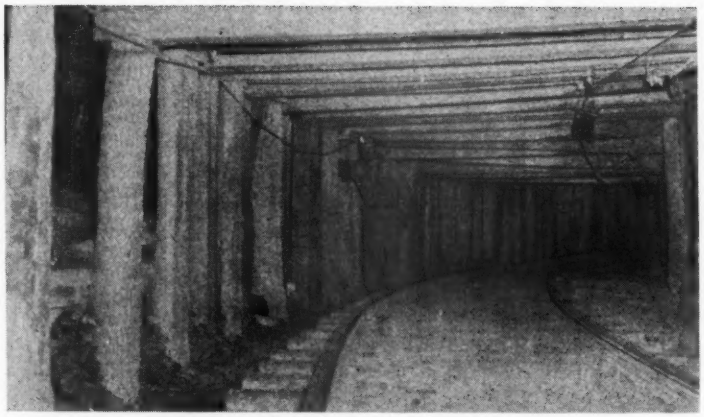
Sapwood contains living cells and takes an active part in tree life. Heartwood consists of dense, inactive tissue. As new outside sapwood is added each year, a quasi-equivalent portion of inside sapwood changes to heartwood. The sapwood is more permeable to preservatives than is the heartwood. In the living tree, sapwood is less susceptible to decay than the heartwood. This condition is reversed after cutting, and is very important from the standpoint of preservative treatment.

The chemical composition of wood is approximately 60 per cent cellulose, 28 per cent lignin, and smaller amounts of other substances. Cellulose forms the framework of the cell wall. Lignin is mixed with cellulose in the cell walls and acts as the binder between cells. Cellulose and lignin give to wood its resistance to decay.

Wood Deterioration in Mines

Wood in mines deteriorates mainly due to attack by fungi, microscopic plants that germinate from tiny spores that float through the air and lodge on and in wood. This fungus attack is called decay. Fungi require for growth, an adequate food and moisture supply, a mild temperature, and sufficient air. Sluggish air circulation adds to the danger of attack and speed of decay. Fungi must have organic matter as food. Some live largely upon cellulose and others upon lignin. The attacking fungus is evidenced by hairlike growths both in the interior and upon the exterior of the wood under attack.

The term "dry rot," used so universally in the mining fields, is indeed a misnomer, as fungi will not grow without water. *Wood that is constantly water soaked or constantly dry (less than 20 per cent moisture) will not decay.* In many cases it has also been found that the presence of acid mine waters inhibits to a great extent the extensive development of wood-destroying fungi. Under like conditions, peeled, untreated mine timbers commonly resist decay much longer than timbers placed with bark on, and seasoned untreated timbers outlast green untreated timbers.



Heavy roof held along main haulageway

What conditions prevalent in underground mines explain the decay problem commonly met? First, the tremendous quantities of timber furnish an ideal food supply for fungi. In addition, the guided air currents in mines transport spores along the main haulways and airways where constant contact with wood is afforded. Thus when decay begins in one section of a mine it rapidly spreads by aid of the mining processes themselves. Many untreated timbers are under attack by fungi when placed in the mine. The moisture supply in most coal mines is sufficient to be prime for the development and support of fungi. The humidity varies, so timbers are seldom constantly dry or constantly immersed in water. During the summer season air in the average coal mine has a high humidity, but in the winter months this humidity decreases. Air in return passages almost always has a humidity approaching saturation. The temperature in most mines is not only moderate, a most favorable condition for the growth of fungi, but remains almost constant throughout the year. Air temperatures in the average coal mine seldom vary from between 50° F. and about 65° F. Temperatures differ, of course, in various sections of the mine.

In addition to an excellent food supply, ideal air circulation as a spore-transporting medium, favorable humidity and temperature conditions for timber decay underground, there are many sections within the mine where air stagnates. These sections, such as airlocks, offer what may be termed the ultimate in favorable conditions for decay. To illustrate, in one of the large mines of a well-known coal company in southern West Virginia, untreated timbers (when used) in main haulways and airways must be replaced due to decay-failure on an average of every two years. Timbers in airlocks in this same mine, however, often completely fail by decay in six months!

Untreated timbers decay so rapidly underground that they frequently fail sooner than expected and result in falls that hinder operations. Decaying timbers create a very serious fire hazard from both standpoints of ignition and spreading, as they ignite readily and burn rapidly.

Methods of Applying Preservatives

The answer to this tremendous problem of timber-decay in coal mining, with its attendant economic waste and danger, is the use of timber chemically treated to resist decay.

The performance record of treated timber in mine service has proven time and again that its use will pay handsomely over a period of years. Many of the larger operators are setting up their own treating programs, with unanimous agreement upon the feasibility of the idea.

Despite the peerless service record of creosoted wood for surface use, much objection has been raised to its use underground because of its comparatively high cost, inflammability, tendency to burn the skin and eyes of workers, and its objectionable odor. Thus in addition to creosoted timbers, salts-treated timbers have come into use in ever-increasing quantities. The three major salts mixtures used in the treatment of mine timbers and ties in the United States are chromated zinc chloride, Osmosalts, and Wolman salts. The latter two of these salts are proprietary (patented) sodium fluoride preservatives.

The preservatives mentioned are applied dominantly according to three methods—by mechanical (hydraulic) pressure, by a "hot and cold bath," and by "natural (osmotic) pressure." Creosote, Wolman salts and chromated zinc chloride are applied under mechanical (hydraulic) pressure, and creosote and chromated zinc chloride also by "hot and cold bath," and Osmosalts by "natural (osmotic) pressure." All timber to be treated is

peeled. Mechanical pressure and "hot and cold" methods require seasoned timber to be effective.

Complete penetration of wood is never obtained. All methods mentioned penetrate the sapwood, and in certain cases a portion of the heartwood as well.

Mechanical pressure application (there are three variations) consists essentially of enclosing peeled, seasoned wood in a retort, which is then filled with preservative. Hydraulic pressures up to 200 lbs. per sq. in. are applied, which force the preservative into the outer wood cells. The loaded retort may be placed under vacuum before preservative application. This is the "full cell" or Bethell process. When the loaded retort is not subjected to a preliminary vacuum, the process is called the Lowry "empty cell process." When an initial air pressure greater than atmospheric pressure is used before application of the preservative, the process is known as the Rueping "empty cell" process. In the "empty cell" processes, air originally compressed in the wood cells expands after relaxation of pressure and forces excess preservative out of the wood. Pressure application of the water-soluble salts is called the Burnett "full cell" process.

In the "hot and cold bath" process, the wood is first immersed in an open tank of hot preservative for several hours, which expands the air in the wood cells and forces some of it out. The wood is then immersed in cold preservative, which causes contraction of the remaining air in the wood and thus an excess of atmospheric over internal pressure. The preservative enters the wood by the force of this external pressure-excess.

In the proprietary "osmotic pressure" process, either green or water-soaked wood is treated externally by dip or brush with a suspension of Osmosalts in water. The treated wood is then stacked and covered for at least 30 days to retard seasoning of the wood, which permits the salts to diffuse from the surface deeply into the moisture-laden interior through the cell membranes, by capillarity and the natural chemical phenomenon known as osmotic pressure. Osmotic pressure is the tendency of a chemical salt in a concentrated medium to diffuse through a membrane into a less concentrated medium. A new variation of this process is the application of Osmosalts in solution to the outer zone of wood, in any state of seasoning, that is specially "moisture conditioned." The stacking and covering to permit osmotic diffusion into the wood is standard procedure. (NOTE: The Osmose process was introduced into this country in 1935, after wide use in Germany. Thus little concerning the process and its service performance has appeared in the United States literature until very recently.)

Judicious Use of Treated Timber a Necessity

Like any other program planned to aid mining efficiency, treated timber must be used with sagacity. All main haulways and airways and airlocks should be timbered with treated material, as well as all other places where a life greater than two or three years is desired. All ties on main haulways, wooden doors and other wood structures underground should be treated.

A factor not emphasized up to the present, but nevertheless important, is the fact that all "semi-permanent" timbers such as ties for non-permanent track can now be treated, recovered and reused. The past, outmoded, antipathy on the part of many operators toward recovery of timber is gradually being overcome, especially where the presence of treated timber gives an added incentive in favor of reclamation. A number of equipment manufacturers have placed on the market machines especially designed for timber recovery. In all cases of intelligent use of these machines with which the writer is familiar, the policy has proven very successful.

In mine development workings that are left temporarily dormant with the intention of later operation, treated timber is a "must." Where a reduction in operations due to external economic conditions is necessary, a mine that has wisely used treated timber is in excellent condition to withstand the impact of poor times, whereas a mine where little or no treated timber was used will more often than not deteriorate to a point where prohibitive maintenance costs force cessation of operations.

A wise treated-timber policy includes not only the choice of proper places to *use* such material but also the knowledge of where *not* to use it. No temporary timbering or tracklaying should be done with treated timber unless recovery is planned.

About 15 per cent of all timber used in coal mining is used for "permanent" work. This naturally varies according to roof condition, stage of the extraction operations, and similar conditions. This means that of the approximately 2,500,000,000 board feet used annually in bituminous mining, 375,000,000 board feet serves in places that are to be kept open for many years. This represents the potential quantity of treated timber that the United States bituminous industry could economically use *underground* each year. A very substantial additional quantity can be added for use in surface track, tipples, bins, and buildings. The present consumption of treated material by the coal mines is less than half of this potential quantity, and probably a minimum of 200,000,000 board feet additional of treated timber could advantageously be used each year.

Strength of Osmore treated timbers is shown in this West Virginia mine

Conclusions

A sustained treated-timber program yields the following advantages:

1. Many thousands of dollars of direct savings annually, on both timber and labor-replacement costs. At an operation where 500 MBF per year is treated and used, an ultimate saving of at least $150,000 is made by each year's treating program.

2. Reduced maintenance costs. Relieves unproductive workers for productive tasks, which in turn raises the production per man per day.

3. Reduces delays due to obstructions by falls and maintenance crews in haulways and airways.

4. Reduces the danger of fire.

5. Permits use of average second-growth woods rather than selected woods.

6. Permits use of smaller-diameter timbers for all purposes.

A NEW JOY DEVELOPMENT...

SULMET BITS

FOR DRILLING ROCK

SULMET TUNGSTEN CARBIDE BITS offer many advantages

INCREASED DRILLING SPEED

Sulmet Bits are super-tough, specially selected tungsten carbide that drills hard rock at a fast rate . . . faster than steel bits because they stay sharp longer.

FEWER BIT CHANGES— LESS TIME LOST

Because Sulmet Bits last longer, give more footage between changes, drilling costs drop sharply.

LONGER FEEDS IN HARD ROCK

Fullest economy of long drill feeds can be realized with Sulmet Bits, for they will bottom hole in almost any rock without time out for changing bits.

NO HOLE TAPER, INCREASED BLASTING EFFICIENCY

You can drill continuously with one size Sulmet Bit, as there is very little loss of gauge; parallel holes increase blasting effectiveness.

REDUCED STOCKROOM INVENTORIES AND LESS HANDLING OF MATERIAL

With one Sulmet Bit performing many times the work of ordinary bits, a correspondingly smaller investment is required for reserve stocks, material handling underground is simplified.

SULMET BITS CAN BE RE-SHARPENED!

ONE SULMET BIT

can do the work of *many* steel bits *with no time out for changes*

Sulmet Bits are new . . . but their efficiency has been PROVED by intensive development in the hardest rock. Developed in collaboration with one of the nation's foremost tungsten carbide producers, Allegheny Ludlum Steel Corp., Sulmet Bits are available now.

AMAZING PERFORMANCE FROM SULMET BITS

The photos to the right speak volumes! As one example of Sulmet performance, in schist containing small particles of quartz, an ordinary steel bit penetrated 7 feet . . . the Sulmet Bit 360 feet. And, THE SULMET BIT WAS SHARPENED FOR FURTHER USE.

But prove Sulmet Rock Bit performance for yourself—try them on your drilling jobs. Contact a Joy Engineer—there's no obligation.

Sulmet Bit after drilling 360 feet

Ordinary steel bit after drilling 7 feet.

LONGER DRILL FEEDS and FASTER DRILLING with SULLIVAN HYDRO DRILL JIB and SULMET BITS

The Sullivan Hydro Drill Jib is designed especially for drilling with a long feed—6 feet or more. Now with Sulmet Bits you can get the same economy of drilling in the harder rocks, because you can bottom the hole with a single Sulmet Bit.

Consult a Joy Engineer

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH 22, PA.

Hard Materials For Rock Bits

PART I

★

By R. W. ADAMSON
Ingersoll-Rand Co.

★

Improvement in the Cutting Quality of Rock Bits is an Important Means of Reducing Drilling Costs. The Increased Speeds Attained, Coupled with the Possible Use of Lighter Equipment, May Influence Greatly Our Future Mining Methods. The Author Reviews the History of Tungsten Carbide Bits and Discusses Their Characteristics and the Research that Led to Their Development

HAVING made great progress in improving the fundamental design of rock drills, designers and metallurgists are now exploring other avenues that may lead to still better over-all drilling performance. Current research is being directed towards reducing the cost of blast-hole drilling by developing bits that will retain optimum sharpness and effectiveness longer than those previously available. This movement, together with appropriate revision of mountings, feeds, and accessory equipment, aimed at increasing the percentage of "throttle time" in the over-all drilling cycle, holds promise of giving real help to mine operators, who are now working under the pinch of pyramiding costs.

Efforts to adapt harder and more wear-resistant material than steel to rock drilling bits are not new. Many operators have at some time or other, experimented with the flame application of hard alloy to the cutting edges of drill steels or bits, and no small number have slotted tips and brazed in replacement inserts of cemented tungsten carbide or similar material. Some encouraging performances were obtained, but the results in general were disappointing.

Cemented Tungsten Carbide

Cemented tungsten carbide, commonly referred to as tungsten carbide or just carbide, is a product of powder metallurgy which has over the past 20 years gained wide acceptance for metal cutting tools, wire drawing dies, and a wide diversity of wear resistant applications. It is typified by a rare combination of excellent resistance to wear and very high hardness, which properties it maintains with only slight reduction at relatively high working temperatures.

Tungsten carbide, chemical formula WC, is made from metallic tungsten powder mixed with lamp black. The final commercial product, cemented tungsten carbide, is made by "cementing" the tungsten carbide crystals with a soft binder metal, usually cobalt. Tungsten carbide powder is intimately mixed with cobalt in a ballmill, the powder mixture is then molded at high pressure, and finally sintered in a reducing atmosphere at temperatures approximating 2500 to 2700 F. During sintering, the original pressed powder compact is converted to a solid body and undergoes a volumetric shrinkage of about 40 per cent.

The December issue of Mining Congress Journal will conclude this article with an account of field test results. Philip McKenna, President, Kennametal Inc., will contribute a further discussion of this important subject.

Improvements in the metallurgy of tungsten carbide manufacture the past few years has resulted in the production of a sufficiently shock-resistant material to permit its use with American rock drills when properly secured into a bit stock of appropriate metallurgical characteristic and design.

Foreign Background

The use of tungsten carbide tips inserted in rock drill bits originated in Germany about 1932. The Germans used them extensively before and during the last war. Even when the carbide was in extreme demand for use in armament production and armor piercing shells, some was apparently allocated to rock drilling bits. Its use is said to have increased the production of sorely needed ores with the limited supply of available skilled labor.

Early in 1946 one government observer from this country reported that at least five manufacturers were producing insert bits in Germany. German practice is predominantly that of inserting the carbide tips in detachable bits, mostly of the screw type. They apparently chose the detachable system for reasons discussed in detail later on. They are partial to elaborate threaded connections, such as conical threaded sections; and to the use of alloy drill steel. Specimens of the bits tested in this country exhibit typical German mechanical skill and the tendency to complicate design.

It is reliably reported that most of the rock drilling in the Scandanavian countries is done today with tungsten-carbide-insert bits and steels. The products of three manufacturers have been tested in this country. These countries use principally chisel (2 point) bits with the inserts brazed into the slightly upset and slotted end of the steel, and assume the extra precautions in operation which the limitations of this method place upon it. They use both carbon and alloy steel, the respective proportions of which are not clear.

Russia is said to have made extensive use of tungsten carbide in rock drilling, but only one translation describing the use of Swedish insert-steel in Russian coal mining practice has been noted.

England has shown evidence of considerable activity in the development of carbide-insert bits. They are not in wide use in that country, but at least three concerns have started manufacturing them. The English have followed the German practice and are manufacturing detachable bits. One manufacturer advertises both threaded and taper connections, the former being recommended for hard rock or difficult drilling conditions.

Detachable insert bits from France, Belgium and Holland have also been tested.

Considerable experimenting with carbide inserts brazed in the upset and slotted ends of "jumper" steels has

been done in the gold mines of the Rand, South Africa. The most recent reports conclude that for general use their life is not yet sufficient to be competitive with steel bits from a cost standpoint.

Foreign Rock Drill Design and Practice

European tungsten-carbide insert drilling practice is constantly associated with reference to "highspeed" drills and "light-foot-pounds" of the piston blow. There is little doubt that this consciousness springs from the limitations of the previously available carbides and the brazing techniques employed.

It is quite revealing to examine closely what is classed as a "high-speed" machine. Several years prior to the last war, Continental rock drills in general possessed slower stroke rate characteristics than most similar drills of American manufacture. Probably the tungsten carbide tips stimulated redesigns with stroke rates approaching the 1900 to 2300 blows per minute at 90 lbs. air pressure, that are typical of present American rock drills. In fact, one of the largest German manufacturers currently lists characteristics of machines for steel bits and machines for inserted carbide tips. The former have listed stroke rates of 1400 to 1600 B.P.M., similar to American machines of the 1920's, and the drills for carbide bits range from 1850 to 2250 B.P.M. Mention is not made of the variation in stroke rate due to the character of the rock, method of feed, viscosity of the lubricant, etc.

Most foreign manufacturers of carbide insert bits and steels impose definite restrictions on their use. They caution against using the bits with more than 75 lbs. air pressure, or with a rock drill weighing more than 45 lbs. Other admonitions are: Collar holes with reduced throttle. Reduce the diameter of succeeding steels or bits by approximately 1 mm., and run at reduced throttle until the bottom of the hole has assumed the same shape as the new bit. Use care and a reduced throttle in drilling through seams. Be sure the machine rotates smoothly. Regrind the bit frequently and parallel to the long edges. Use a template for control of the cutting edge profile, and hone the edge after grinding.

Development of a Bit

In the development of a tungsten carbide insert bit suitable for commercial distribution in this country, the Ingersoll-Rand Company working in collaboration with the Carboloy Company, sought to reduce or eliminate the restrictions placed on most bits of foreign manufacture. The bit which was developed has the trade name of "Carset Jackbit."

The cross-bit design was selected

Although its construction is more complicated, it was decided to first develop a four-point bit because: (a) It would have wider application. (b) The gauge loss should be about one-half that of a two-point (chisel) bit, and the need for additional slightly reduced bit sizes for drilling holes of a predetermined diameter, regardless of the number of steel changes, might be eliminated. (c) The bit could be used on more powerful rock drills to advantage because the impact is distributed among four edges instead of two. (e) The drilling life should be longer.

It was made detachable, because: (a) No radically new material or approach to the problem was at hand, and it was apparent that if a successful commercial bit was to be developed for American operations, the selection of material and the refinements in machining, heat treating and brazing were only practical in a piece the size of a detachable bit. If the expensive inserts were to be used economically, retention in the holding medium for the longest possible period was essential. (b) If, as proved to be the case, different sizes for drilling the same hole were not necessary, the detachable feature would give it greater adaptability of application. (c) The bit could be attached to a rod or shank of any section or length. (d) In the event of a broken or damaged rod, the bit might be reclaimed by reason of its detachability. (e) It was felt that a satisfactory connecting medium had been developed.

Construction and Test Procedure

Details of the heat treating and brazing techniques of most manufacturers of insert bits are classed by them as trade secrets. However, other aspects of the development are of interest.

Progress of the work was determined by drilling with the bits in approximately six-ton blocks of granite quarried near Barre, Vt., and freighted to Phillipsburg, N. J. Over 80,000 ft. of hole was drilled, using DA-35 Power Feed Drifters (3½ in.

The only effective method of bit testing—drilling in rock

bore) on quarry-bar mountings with 90 lbs. air pressure. The bits were run to destruction without resharpening. An attempt was made to make only one change at a time to evaluate the variable factors as closely as possible.

Barre granite is not the hardest of granites, but it is representative of average drilling conditions and it is the most uniform rock available for test purposes.

It was originally thought that the friability of the tungsten carbide was the principal problem to overcome, but such did not prove to be the case. One of the toughest and most shock-resistant formulae known to the manufacturer of the material was standardized in the preparation of the tips. They were ground on three sides on diamond impregnated wheels and plated, prior to insertion and brazing. The bit consists of the four tips, an alloy steel body and an annular ring of a different alloy steel separating and backing the tips around a center flushing hole. It is axiomatic in the tungsten carbide trade that pieces of carbide cannot be successfully "backed" against each other, and the fortunate discovery that an annular ring could be used, contributed greatly to the success of this development. The present material and dimensions of the ring were arrived at by the trial and error procedure. Too light a ring permitted crushing by side pressure from the inserts in drilling, and too heavy a ring did not give sufficient resiliency to assure a stabilized braze.

It was discovered that a successful brazing technique was dependent upon fine slotting tolerances and close metallurgical control of the high-alloy steel base.

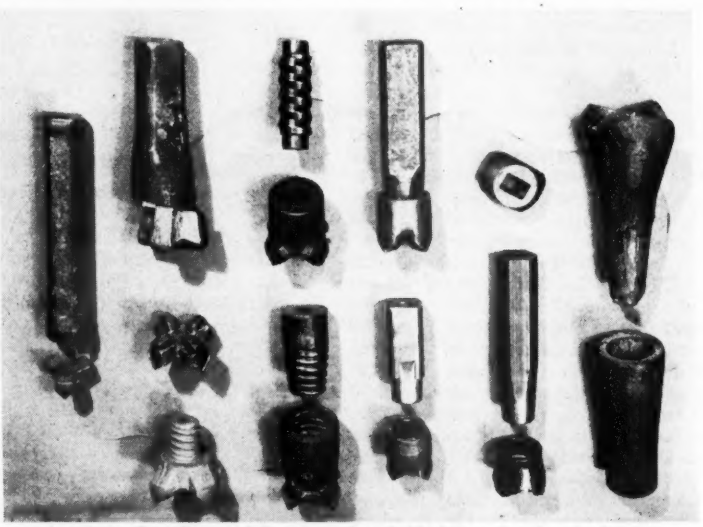
Destruction of a finished bit by laboratory methods did not save much test drilling. A braze material or technique which produced an insert setting that had a high test shear figure, might fail prematurely from fatigue or other reasons which were not obvious.

Retention of the inserts in the bit proved to be more of a problem than the friability of the tungsten carbide, although the two are closely related. Any slight deformation of the steel at the base of the insert caused either or both the insert or the braze to fail.

In the early development stages when the bits were averaging only 70 to 90 ft. in granite, the insert usually came out whole. When the bits were released for sale commercially, the average life in granite exceeded 225 ft., and more often than not, at the time of failure, a segment of carbide was left in the slot, indicating a stronger braze. The almost negligible elasticity of the carbide results in its rapid fracture if it is not closely and continually supported by the "backing material."

It was gratifying to observe that significant improvement of the bit under the test conditions in granite was usually accompanied by a proportionate improvement when spot-checked under the varying conditions of field test.

Based on results in granite, the impression was first gained that a bit could be developed which might be completely expendable, in that resharpening under many conditions would not be necessary. However, it has been found that from one to three resharpenings are usually necessary to approach the greatest ultimate bit life when using the grade of carbide most satisfactory for general use. With light machines, such as, 2⅝ in. bore, 60-lb. Jackhamers, there is in many formations, a critical point of dullness of the cutting edge, beyond which the drilling speed falls off rapidly and early failure of the inserts can be consistently predicted, if the sharpness of the cutting edges is not restored. The critical point of dullness when used on heavier machines is usually not so definite.



American, Canadian, and European detachable bits and rod ends show a wide variety of shapes and construction

Connecting Medium and Drill Rod

The "Carset" bit screws on an alloy steel stud in the drill rod. The cold stud is driven into the punched and heated end of a drill rod by means of a patented operation with a drill steel sharpener. Any commercial drill steel can be used in making the stud rod, and most any steel reconditioning shop can be equipped for this operation.

The technology of a successful brazing practice, satisfactory for use under a wide range of field conditions, dictates that the material for the insert bit body have physical and metallurgical characteristics, such as coefficient of expansion and hardenability, different from those of an acceptable drill steel. Consequently, a practical and successful connection is all-important.

In the three-member system adopted, that of the bit, connecting element and rod, each member can be of a material and design most suitable for the functions which each is to perform.

Rapid expansion of the use of the so-called alloy drill steels is predicted for use with insert bits. The inherently high resistance to fatigue of some alloy steels is a desired property for use with the manifold longer-lived insert bit, as compared to a steel bit.

The bit should be removed from the rod by means of pipe wrenches instead of a hammer in order to avoid damaging the relatively friable inserts.

In actual use when a "Carset" bit is discarded or removed for sharpening, a new bit is placed on the starting rod. Occasionally unequal gauge wear requires interchange of the bits from one rod to another.

Experimental Work Continues

Considerable experimental work has been done with different grades of tungsten carbide than that currently standardized. Some interesting but erratic results have been obtained. The problems of carbide friability and still more exact setting are increased. One is reminded of a watch maker setting jewels in this technique. It is probable that a harder grade of carbide will be used successfully in a fairly wide range of use.

Development of additional bit sizes

Today's rock bits must withstand the impact of powerful automatic machines drilling in the hardest of granites and quartzites

is proceeding. It is interesting to observe that some new critical factors in brazing and design are involved with the development of larger and smaller sizes, in order to obtain a consistently satisfactory bit.

The upset size of the stud rod diameter is 1.25 in. The new bit diameter is 1.50 in. The usual discard size for reasons of gauge wear is 1.30 in. to 1.35 in., although bits have been successfully used past this point in hard abrasive sandstone.

If one of the four inserts fails prematurely, considerable additional drilling can usually be accomplished with the bit. An insert cannot be replaced.

These bits have been found equally suited to wet or dry drilling. Tests have been observed of dry drilling where the steel bits used were heated sufficiently in the drilling operation to become blue in color and have the hardness affected from the excessive heat generated by the reaction of the dulled bit against the rock. The bit could almost be held in the bare hand when removed from the hole, the heating action was so slight.

The nearly-uniform-diameter hole produced by the bit is a distinct aid to improved "hole cleaning" in most drilling operations. This is especially noticeable in dry drilling, or in wet drilling when air is admitted through the steel in direct blowing. The velocity of the blowing air with its suspended cuttings is not reduced or dissipated by the larger volume of the conventional conical-shaped hole, and the cuttings are more readily discharged.

Instruction Required for Proper Use of New Bits

Some administrative changes, together with worker orientation and direction are indicated requisites for successful use of the new bits.

The management's responsibility for correct application, accountability and distribution of the more expensive bits is, also, paralleled by a responsibility for the worker's education in their economical use. The worker's reaction to initial use of the bit generally piques his interest and the educational phase is accomplished without difficulty. Most rock drill operators are quick to comprehend the time and energy savings incident to use of the bit. Cooperation is thus assured, if for no other reason than the implied penalty of withdrawal of the insert bit from his use.

If these bits are to be used economically in the majority of operations, what is termed the "attrition factor" must be held to a minimum. That is, the percentage of reduced average bit life accruing from inept handling; continued drilling after redressing is indicated; loss or damage in transit; use with improperly fabricated or worn drill rods; theft; and loss in the hole.

(To be Continued)

★

ROYCE A. HARDY
Consulting Engineer
Getchell Mine, Inc.
and
F. W. McQUISTON, Jr.
Metallurgical Engineer
Newmont Mining Corp.

★

Developments of Carbon Cyanidation At Getchell Mine, Nevada

The carbon cyanide treatment of complex gold ores was discussed at the 1946 AMC Convention in Denver. Experiments with the process are continuing and the accompanying article, which is in the nature of a progress report, indicates that the process has considerable merit when treating ores presenting thickening and filtering problems.

THE Getchell orebody occurs in a replacement tuff shale bed following a basin range fault on the east slopes of the Osgood Range, Humboldt County, Nev. The ore shale bed is highly siliceous with considerable carbonaceous material along with a clay gouge having the properties of bentonite.

In developing an improved flow sheet for milling the sulfide ores to make them amenable to cyanidation several interesting features have been brought forth. The minerals of the ore body were introduced at different periods. Arsenic occurs principally as realgar and orpiment, barren of gold, and to a minor extent as arsenopyrite. The gold occurs free in the colloidal state also in small micron sizes in the pyrite and possibly arsenopyrite. The ratio of pyrite to arsenopyrite is 24:1. Approximately 60 per cent of the pyrite is minus 200 mesh and 20 per cent is minus five microns in size.

Previous milling operations encountered serious settling and filtering problems due principally to the vein gouge; however, the soluble gold values are easily recoverable from cyanide pulps by adsorption with activated carbon.

Three methods of carbon cyanidation have been investigated at Getchell Mine by the authors and by T. G. Chapman, Dean, College of Mines, University of Arizona. Two methods, flotation of carbon, and separation of carbon from cyanide pulps by screening were described at the American Mining Congress, in Denver, Colo., in September, 1946. The third method of confining carbon within adsorption screen cylinders was mentioned in Denver as being under development by Getchell Mine.*

Recovery from Screen Cylinders

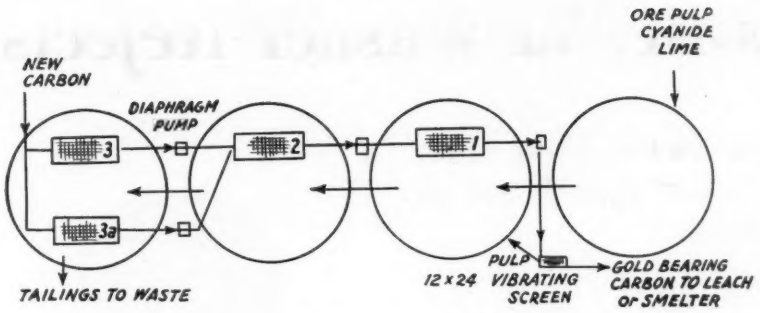
Laboratory tests disclosed the fact that carbon confined in screen cylinders, partially submerged in cyanide pulps, gave good recoveries of the dissolved gold values. Two-hundred-pound tests also gave favorable results. A batch test at the University of Arizona in a 5 x 5-ft. agitator gave the required data necessary for a 100-ton pilot plant operation.

Adsorption cylinders for gold recovery from cyanide pulps have been operating for a period of four months in a 100-ton per day pilot plant. This is not a batch system but a continuous process of cyanidation.

A description of the plant and the adsorption cylinders is as follows: Three 16 x 16-ft. agitators in series comprise the adsorption plant. The first two agitators each contain one revolving cylinder and the third or last agitator contains two cylinders. The cylinders are 3 ft. in diameter by 6 ft. long. Cylinder frames are first covered with wire screen having 1-in. square openings. The wire screen is covered with 30-mesh stainless steel cloth. Wire diameter is 0.015 in. with 0.013-in. openings. Blue battery cloth had a life of only a few days whereas stainless steel cloth indicates a life of approximately two months.

Problems encountered thus far have been principally mechanical and the development of adsorption cylinders has been a tedious job. A new cylinder designed and built by the Mine & Smelter Supply Co. has proved quite satisfactory. This cylinder comprises a 4 x 4-ft. rolled punched steel plate covered with 30-mesh stainless steel cloth. The cloth is wound with wire in the same manner a drum filter is wrapped. A drum type feeder feeds

* Carbon Cyanide Mill Tests of the Getchell Mine, Nevada, by R. A. Hardy, American Mining Congress, 1946, Denver, Colo.



The carbon advances against the pulp flow

the carbon into the cylinder and removal of the carbon is accomplished with an adjustable internal scoop.

Each cylinder requires less than one-half horsepower and turns 10 r.p.m. The screen cylinders are mounted on the top of the agitators and have a submergence of approximately 9 in. below the pulp level.

Ample Agitation Required

The peripherial speed of the cylinders and the depth of submergence, within reasonable limits, do not appear critical. Either the Dorr or Devereaux type agitator is satisfactory if compressed air or additional speed is used. Good agitation is essential for efficient adsorption. Adsorption of the gold from solution by the activated carbon is not entirely a function of contact as it is not mechanically possible for all the pulp in the agitators to pass through the cylinders. Migration of the gold cyanide ion to the carbon apparently takes place to some extent.

The above diagram shows the flow sheet from which it will be seen that the carbon advances counter current to the flow of the pulp. New carbon is added to the cylinders in the final agitator. The carbon is pumped from the screen cylinders to the head agitator where the carbon adsorbs its final gold load. By advancing the carbon from the last agitator to the first agitator new carbon is added to the lowest grade solution to scavenge gold values.

Low Gold Solution Losses

The four adsorption cylinders in the three agitators gave final solution assays of 0.002 oz. gold per ton on a solution feed assaying 0.04 oz. gold per ton. The addition of a fifth cylinder gave 0.001 oz. barren assay on 0.05 oz. solution feed. Gold solution loss was 5 cents per ton of ore. These results indicated that two cylinders in each agitator would probably yield trace barren solutions. With one screen in each agitator trace barrens were made by adding half a pound of carbon, per ton of ore feed, loose in the last agitator. The carbon was recovered by screening.

Retention time in the three agitators was 30 hrs. Carbon consumption per ton of ore has not as yet been definitely determined; however, on agitator feed from which 0.10 oz. of gold per ton was dissolved by cyanide good barrens were made with 1.5 lb. of carbon per ton of ore. It is indicated that 1 lb. of carbon per ton of ore may adsorb 0.10 oz. of dissolved gold per ton of ore.

An example of carbon assays from the different cylinders are as follows:

No. 1 Agitator Adsorption Cylinder, 82.6 oz. Au per ton.

No. 2 Agitator Adsorption Cylinder, 45.3 oz. Au per ton.

No. 3 and 3a Agitator Adsorption Cylinders, 12.6 oz. Au per ton.

Dissolution of the gold is substantially completed in an agitator ahead of the first adsorption agitator. Cyanide and lime are held to a minimum with only a trace of each maintained in the last agitator.

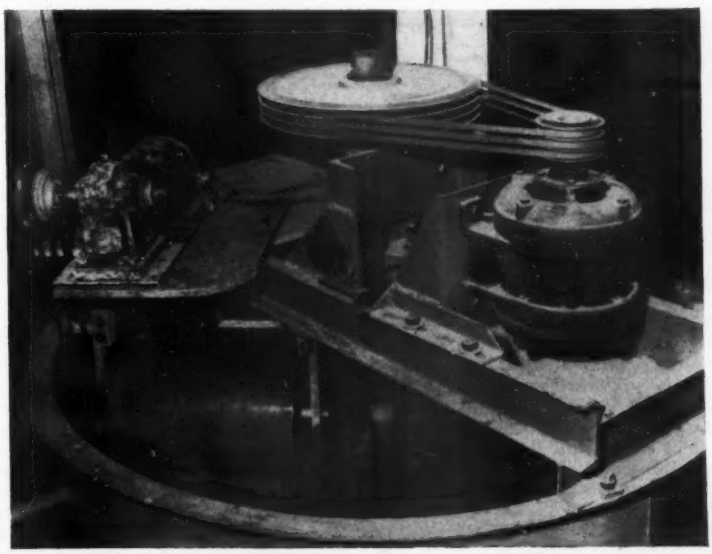
The Reduction to Gold Bullion

Three methods of reducing the gold or the carbon into bullion offer possibilities. (1) Leaching of the carbon with cold 3 per cent solutions of sodium sulfide and caustic soda. Ninety per cent of the gold can be leached from 50-oz. carbon. This method of recovery offers the possibility of reusing the carbon several times before reducing the carbon to bullion. (2) Burning the carbon to an ash and melting the ash directly to bullion in the same way zinc precipitates are melted. (3) Direct smelting of the carbon. Several custom smelters are in the market to buy carbon concentrates.

Carbon cyanidation offers considerable merit for the treatment of gold ores presenting thickening and filtering problems. A carbon cyanide plant using only agitators and not requiring thickening and filtering pulps offers simplicity in equipment and plant design.

Adsorption cylinders for the recovery of dissolved gold from cyanide pulps is still in the experimental stage at Getchell Mine. Carbon cyanidation gives favorable metallurgical results; however, in continuing development of this method of cyanidation additional mechanical improvements will be necessary.

Getchell Mine is contemplating using carbon cyanidation in their new flow sheet, which will involve treating the slime portion of the ore, approximately 750 tons per day of a 1,500-ton mill feed.



An experimental unit at the College of Mines, University of Arizona

Coal Losses in Washer Rejects

A Report of the Surface Preparation Committee, Showing the Fuel Value Lost in Coal Cleaning with Different Theoretical Yields and Washer Efficiencies

By J. DICKERSON MARTIN

THE adoption of full seam mining by a coal company must, or at least should be, based on economics. In other words, what will be the dollars and cents gained (or lost) when an entire seam, including its impurities, is loaded underground and cleaned mechanically at the surface. Like all other questions in mining, the answer is complicated by a number of factors and the Committees on Surface Preparation and Mechanical Loading are making a joint study to bring out the various considerations which must be taken into account when a change from selective to full seam mining is contemplated.

Prior to 1940, few bituminous coal washeries operated with rejects higher than 10 per cent of the input feed. Therefore, marketable coal (floats) in the rejects did not create any problem, nor any great financial loss to the operator. Today, with mechanical and full seam mining, it is not uncommon for the rejects from bituminous coal washers to reach as high as 30 or 40 per cent of the input feed. With such high washer rejects, a very small quantity of marketable coal (floats) in the rejects, can and does result in a very large monetary loss to the operator.

There is no such thing as perfection and in line with this axiom, all coal washers operate with a certain amount of inefficiency; that is to say, the cleaned product will have some slate and the refuse will contain some coal. This inefficiency is expressed in terms of percentage of material in the clean coal (sinks), which has a gravity greater than the gravity at which the washer is operating and a certain percentage of material in the rejects (floats), which has a gravity less than the gravity at which the washer is operating. The material in these two increments is referred to as "sinks" and "floats," and is expressed in weight percentage of the cleaned coal and weight percentage of the rejects. The quantity of "sinks" or "floats" in either the cleaned coal or rejects depends to a large extent upon the washing characteristics of the washery feed as well as proper adjustment and operation of the washing unit.

TABLE NO. 1

COMPARISON OF COAL LOSSES IN REJECTS FOR COALS WITH 10 AND 30 PER CENT REJECTS, WASHER OPERATING WITH SAME EFFICIENCY ON EACH COAL

Washer No.	Theo. Rejects at Washing Gravity Wt. Per Cent	Washer Input Tons Per Hour	Sinks in Cleaned Coal Wt. Per Cent	Floats in Rejects Wt. Per Cent	Actual Rejects Wt. Per Cent	Marketable Coal in Rejects Tons Per Hr.	Marketable Coal in Rejects Per Yr. Tons	Annual Loss At $4.00 Per Ton
1	10	100	0.50	6	10.16	.16	560	$2,240
2	30	100	0.50	6	31.55	1.55	5,425	$21,700

TABLE NO. 2

COMPARISON OF COAL LOSSES IN REJECTS FROM TWO WASHERS CLEANING THE SAME COALS AT DIFFERENT EFFICIENCIES

Washer No.	Theo. Rejects at Washing Gravity Wt. Per Cent	Washer Input Tons Per Hour	Sinks in Cleaned Coal Wt. Per Cent	Floats in Rejects Wt. Per Cent	Actual Rejects Wt. Per Cent	Marketable Coal in Rejects Tons Per Hr.	Marketable Coal in Rejects Per Yr. Tons	Annual Loss At $4.00 Per Ton
1	30	100	.50	2	30.26	.26	910	$3,640
2	30	100	.50	6	31.55	1.55	5,425	$21,700

NOTE: Tonnage on basis of 100 tons per hour input feed, Annual losses on basis of $4 coal, 250 14-hr. shifts.

As a preliminary, the following report is presented to show how the amount of coal in the reject from a washer determines the economic success of the operation. Different yields and different washing efficiencies all have an effect and while this report does not give the answer it does show how the answer may be obtained at any individual operation.

Calculating the Reject Losses

In Table No. 1 is shown the annual estimated losses of marketable coal in the rejects that might be expected when washing two coals of similar washing characteristics but with theoretical rejects at the same washing gravity of 10 and 30 per cent. From this table it will be observed that

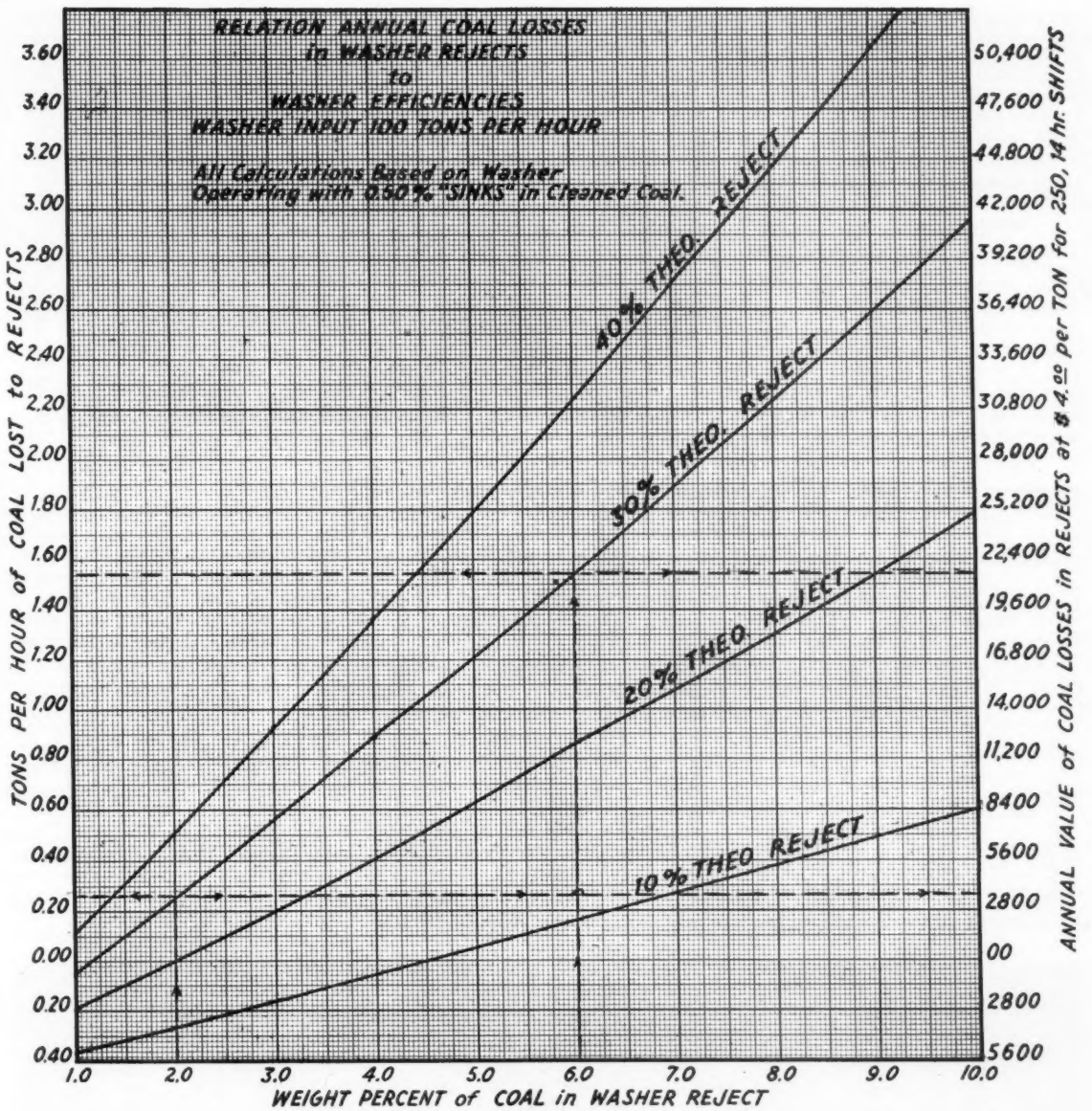


Chart No. 1

when operating each of the washers with an input feed of 100 tons per hour, and the same separating efficiency, the annual loss of marketable coal in the rejects from a coal of 30 per cent theoretical rejects, is $19,460 greater than would be the loss when the feed contains only 10 per cent theoretical rejects. Should the washer input feed be increased to 300 tons per hour, the annual loss of marketable coal for the 30 per cent reject feed would become $65,100.

Next, to show the effect of washer inefficiency, consider that two separate cleaning plants are treating the same coal, with the same rate of input feed, operating at the same specific gravity, and both with a theoretical reject of 30 per cent of the input feed. Suppose further that No. 1 washer is operating with .05 per cent "sinks" and 2 per cent "floats," while the No. 2 washer is operating with .05 per cent "sinks" and 6 per cent "floats." Then there would be a very large annual loss to the operator of the No. 2 washer caused by washer inefficiency. As shown in Table No. 2 which covers coals of similar washing characteristics but operating at different efficiencies, the reject loss at No. 2 washer is $21,700 per year which is $18,060 greater than the $3,640 loss experienced by the operator of the No. 1 washer.

In Chart No. 1 is shown the loss in tons per hour and monetary loss per year when cleaning coals with 10, 20, 30 and 40 per cent rejects; the washer operating with .05 per cent of material in the cleaned coal (sinks) heavier than the washing gravity and with 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 per cent of the material in the rejects (floats) lighter than the washing gravity. The tons of marketable coal lost per hour are all on the basis of an input feed of 100 tons per hour and the annual monetary losses are on the basis of $4 coal, with the plant operating 250 14-hour shifts per year.

To read from Chart No. 1 the data given in Table No. 2, follow the dotted vertical line from 2 per cent at bottom of chart where it intersects the line of 30 per cent reject coal, then

follow the dotted horizontal line to the left to read the coal losses per ton and to the right for the monetary losses per year. The same procedure is followed for reading the losses when a washer is operating with 6 per cent floats in the rejects.

Table No. 3 illustrates the method of calculation used to obtain the information from which Chart No. 1 was plotted.

Chart No. 2 is presented for the purpose of showing the percentage of *"theoretical available"* marketable coal in the washer input feed at different yields that would be lost to the rejects when the washer is operating with different quantities of floats in the rejects (Table No. 3). By following the dotted lines, it will be observed that when a washer is cleaning 30 per cent reject coal and operating with .05 per cent sinks in the coal and 6 per cent floats in the rejects, there would be a total of 2.21 per cent of the original available coal at the washing gravity lost to the rejects. Should the input feed be 100 tons per hour and the theoretical yield 70 per cent, we would have 70 tons x 2.21 per cent, or 1.55 tons per hour lost (Table No. 2). It is in this chart the relationship between coal lost in the washer rejects and the *"theoretical available"* marketable coal fed to the washer can be readily observed.

A coal loss means a money loss, and with the rising costs of labor and material the industry must look for every possible means to increase the tonnage yield and reduce waste.

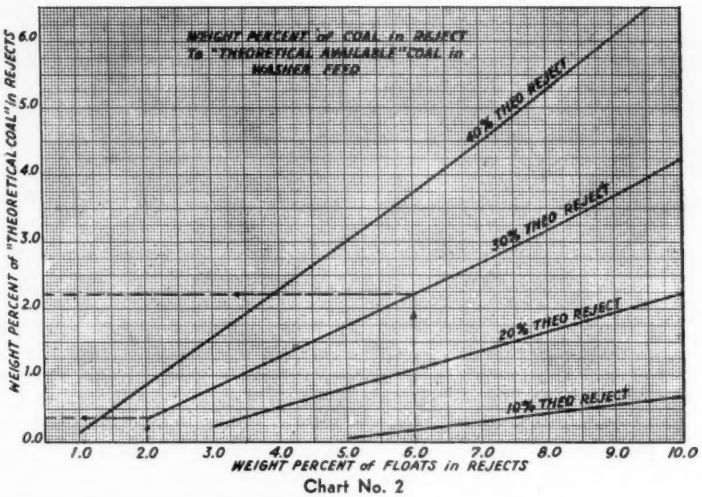


Chart No. 2

TABLE NO. 3—Relation of Coal Losses in Washer Rejects at Different Washer Efficiencies

Estimated Washer Rejects Based on the Washer Operating With .50 Per Cent "Sinks" in the Cleaned Coal With "Floats" in the Rejects From 1 to 10 Per Cent

Theoretical Rejects—30 Per Cent of the Input of 100 Tons Per Hour at 250 14-Hour Shifts

Sinks in Cleaned Coal Wt. Per Cent	Floats in Rejects Wt. Per Cent	Actual Rejects Wt. Per Cent	Marketable Coal in Rejects T. P. Hr.	Marketable Coal in Rejects T. P. Yr.	Annual Loss at $4.00 Per Ton
0.5	1	29.95			
0.5	2	30.26	.26	910	$3,640
0.5	3	30.57	.57	1,995	7,980
0.5	4	30.89	.89	3,115	12,460
0.5	5	31.22	1.22	4,270	17,080
0.5	6	31.55	1.55	5,425	21,700
0.5	7	31.89	1.89	6,615	26,460
0.5	8	32.24	2.24	7,840	31,360
0.5	9	32.60	2.60	9,100	36,400
0.5	10	32.96	2.96	10,360	41,440

Dorrance Preparation Plant of West Virginia Coal and Coke Corporation

WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

IN late October, two weeks before the off-year elections November 4, the President called a special session of the Congress to meet November 17. The White House stated that the summons was issued to check rising prices as well as to provide means of aiding in the reconstruction of foreign countries.

The President had before him the report of his Special Committee on National Resources and Foreign Aid, a 239-page document prepared under the direction of Interior Secretary Krug, which presents an appraisal of national resources and their ability to meet a $20 billion foreign aid program. The report states that shortages resulting from high consumption will be intensified, particularly in such commodities as steel, coal and certain industrial equipment, including mining machinery, but that these shortages will tend to diminish because foreign aid needs for many critical commodities can be expected to taper off sharply as production abroad gets under way. It sounds a warning that this country must extend its efforts to discover and develop new sources of supply for many basic materials, and must apply "new and better methods of using low-grade ores, by-products and what are now waste materials."

Tax

Jumping the gun on any "aid-to-Europe" legislation, House Ways and Means Committee Chairman Harold Knutson of Minnesota has announced that he will introduce a tax reduction bill as soon as Congress convenes November 17. Knutson's measure would reduce income taxes by $4 billion, through application of the "community property" principle together with percentage cuts in the various income brackets, adjusted to make the overall savings about equal to those proposed in the bills which met a veto in the last session.

Meanwhile the Roswell Magill Special Tax Study Committee has rendered its report to the Committee on Ways and Means, which is now conducting hearings. The report approves the "community property" principle and a general reduction in individual income taxes, together with a revision of surtax schedules. To alleviate the present double taxation of corporate income the committee recommends that the shareholder be allowed an appropriate credit or offset against his own tax, for the tax paid by the corporation with respect to his dividends.

In discussing taxation of small corporations, the Committee states that so long as the corporation tax rate remains materially above the initial tax rate on other incomes, it is necessary and desirable to extend some relief to small corporations. The Committee takes the position that the present arrangement whereby a rate of 53 per cent is applicable to the net income between $25,000 and $50,000, is defective; that it should be changed to provide a smooth transition between the lowest rate (currently 21 per cent) and the standard corporation rate (currently 36 per cent).

To meet the problem of fluctuating business incomes the Committee recommends that the net operating loss carry-forward be extended from two to seven years and that the net operating loss carry-back be discontinued. On intercorporate dividends the Committee recommends that corporations receive a full credit for dividends received from other corporations which have already been subjected to the Federal income tax, instead of the present 85 per cent credit. It also recommends that the 2 per cent differential charged against corporations for the "privilege" of making consolidated returns be eliminated. On capital gains taxation the Committee recommends that the current rate and method of taxing capital gains be continued, with certain modifications to close loopholes and to give more equitable treatment to capital losses.

Other recommendations of the Committee deal with annuities; the taxation of trust income, including family trusts and short-term trusts; taxation of undistributed net income; employes' pension plans, stock purchase plans, depreciation, research, development and sales promotion expenses, exchanges and corporate reorganizations and foreign tax credits.

Foreign Trade Agreements

The Foreign Trade Agreement conference at Geneva concluded October 30 when representatives of 23 countries signed the final act of the Conference. A protocol signed by the United States, United Kingdom, the Netherlands, Luxembourg, Canada and Belgium calls for the new tariff schedules attached to the general agreement on tariffs and trade to be put into effect on January 1. It has been announced by the State Department that the agreement covers more than 45,000 items (including some minerals), but the full details will not be made public until November 18.

The agreement provides general application of the principle of most-favored nation treatment to the concessions on tariffs and trade preferences. Concessions are understood to

Washington Highlights

WHITE HOUSE: Calls Congress for November 17.

TAX: $4 billion reduction bill coming.

TRADE AGREEMENTS: General conference fixes tariff cuts.

FREIGHT RATES: ICC grants "temporary" increase.

TAFT-HARTLEY ACT: NLRB demands compliance.

WAGE-HOUR AMENDMENTS: Hearings resume.

WESTERN HEARINGS: Aid in mine development requested.

ATOMIC ENERGY: New Mining Advisory Committee.

BUREAU OF LAND MANAGEMENT: Reorganized.

be subject to the American-sponsored provision that if, through unforeseen developments, a particular tariff reduction should increase imports so sharply as to cause or threaten serious injury to domestic producers, the country granting the reduction may suspend its operation in whole or in part. The imperial trade preference stumbling block has been met by an exchange of notes between Britain, South Africa and Canada, releasing each other from obligations to maintain these preference margins in any further negotiations with non-Empire countries.

Freight Rates

On October 7 the Interstate Commerce Commission acted on the petition of the railroads for a general 10 per cent increase in freight rates by granting an overall boost averaging 8.9 per cent. Increases of from 10 to 11 cents a ton were granted on coal, coke and iron ore. The new rates were made effective at 12:01 a. m., October 13. They are of a temporary nature pending decision on the railroads' request for a general 27 per cent increase.

Hearings began November 3 on the petition for the general 27 per cent rate increase.

Taft-Hartley Act

Early in October the AFL convention in San Francisco trimmed John L. Lewis' wings on the issue of filing anti-Communist certificates by eliminating Lewis and 12 other vice presidents as officers of the AFL. The National Labor Relations Board had in the meantime ruled, on October 7, that the Taft-Hartley Act does not require top AFL and CIO officials to sign non-Communist affidavits. At the present time the principal unions whose officers are still holding out against furnishing the affidavits are the United Mine Workers, the CIO's United Electrical, Radio and Machine Workers, and the International Union of Mine, Mill and Smelter Workers. The CIO United Auto Workers Union has notified the NLRB that it will comply and it is indicated that the CIO Steel Workers Union will also come in. AFL President William Green and Secretary-Treasurer George Meany have complied with the NLRB ruling.

In a ruling made under the Act the U. S. Court of Appeals set aside an August, 1946, order of the NLRB, requiring the L. A. Young Spring Wire Corp. to bargain collectively with the Foremen's Association of America, stating, "it is now unmistakably clear that the 80th Congress intended to deny, and has denied, the benefits of the National Labor Relations Act to 'supervisors'."

Wage-Hour

Hearings looking toward amendment of the Fair Labor Standards Act were resumed by Representative McConnell's (Rep., Pa.) House Labor Subcommittee on October 20. The subcommittee is centering its attention on administrative features of the Act, as discussed in the October issue.

Some witnesses are calling for repeal of both the minimum wage and maximum hour provisions of the Act, asserting in particular that the 40 hour week is a limitation placed upon our greatest natural resource, the energies of our people; that it restricts production and saps our national strength.

The Wage-Hour Division of the Department of Labor has announced hearings December 2 on the regulations relating to exemptions accorded to persons employed in executive, administrative, professional or local retailing capacities, or as outside salesmen. Administrator McComb has proposed changes in these regulations, which will be the subject of consideration at these hearings.

Constitutionality of the new Portal-to-Portal Act has been upheld by a Federal District Court in Pennsylvania. The court has dismissed 43 suits against steel companies, denying the contention of counsel for the unions that the act has withdrawn "vested rights" from employes to seek back travel-time pay. The court's interpretation is that the employes had only a "qualified" right, which could have been, and was, withdrawn by Congress in enacting the 1947 Act.

Western Hearings

The House Small Business Subcommittee carried on in late September and early October with hearings at Phoenix, Ariz., and at Denver, following its work in Seattle and Reno, discussed in our last issue. In Phoenix, Secretary Charles F. Willis of the Arizona Small Mine Operators Association called for a shaping of Government policies to encourage discovery and development of small independent mines. He urged a limited continuation of premium payments to carry small producers during the readjustment years and to stimulate development of new ore bodies. Willis demanded protection against low cost foreign mineral production and sharply criticized propaganda which would have the public regard this country as a "have-not" nation. He also emphasized the need for stockpiling, with adherence to a "Buy American" policy, as well as easing of SEC restrictions, tax revision to encourage venture capital, and cooperation by Federal and State governments in developing sub-surface ore bodies. Further elaboration on these points was presented by Director Charles H. Dunning of the Arizona Department of Mineral Resources and many other witnesses.

At Denver, N. S. Ballentine, E. P. Chapman, Jr., J. N. Dunn, Charles N. Bell, Robert S. Palmer, Jack Pierce, Secretary of the New Mexico Miners & Prospectors Association, and Jesse L. Maury testified before the subcommittee, calling in the main for restoration of premium price payments to maintain production of copper, lead and zinc.

The termination date of the Office of Premium Price Plan has been extended to December 31, 1947. Director C. O. Mittendorf stated that this action followed discussions in mid-October by the interested Government agencies, who considered it advisable not to disturb the continuity or the authority which has existed throughout the operation of the Premium Price Plan. Mittendorf has requested that one copy of customary exploration reports and correspondence relating to approved projects be mailed to the Office of Premium Price Plan, Room 2204, Tempo K Bldg., Washington, D. C., and that an additional copy be addressed to Mr. Jesse C. Johnson, Deputy Director, Office of Metals Reserve, as heretofore.

Atomic Energy

An Advisory Committee for Exploration and Mining has been created under the new Division of Raw Materials in the U. S. Atomic Energy Commission. The Division, under Dr. John K. Gustafson of Salt Lake City as director, is charged with activities concerning raw materials, including exploration, development and procurement of various types of materials required in the program of the commission. Members of the Advisory Committee for Exploration and Mining are: Donald H. McLaughlin, president, Homestake Mining Co., chairman; G. Temple Bridgman, consulting engineer of San Francisco; Everette L. DeGolyer, petroleum geologist of DeGolyer & McNaughton, Dallas, Tex.; Anton Gray, geologist, Kennecott Copper Corp.; Wilber Judson, vice president and director, Texas Gulf Sulphur Co.; Robert E. McConnell, trustee, McConnell Foundation of New York, and Fred Searls, Jr., president, Newmont Mining Corp.

On October 13 the Department of the Interior amended its general mining regulations with respect to mineral patents as follows: "Every application for patent, based on a mining claim located after August 1, 1946, shall state whether the claimant has or has not had any direct or indirect part in the development of the atomic bomb project. The application must set forth in detail the exact nature of the claimant's participation in the project, and must also state whether as a result of such participation he acquired any confidential, official infor-

(*Continued on page* 61)

Personals

Thomas Moses, former president of H. C. Frick Coke Company and other subsidiary mining companies of United States Steel Corporation, has been named director of the State Department of Mines and Minerals in Illinois. The post, considered a difficult one in the aftermath of the Centralia, Ill., mine disaster last March, had been filled temporarily by **Harold L. Walker**, head of the department of mining at the University of Illinois, following the resignation of Robert M. Medill, former director, last April 1st.

Thomas Moses

Mr. Moses has had a long and active career in the coal mining industry. He has been a miner, night mine foreman, secretary of the Illinois State Mining Board, Illinois State mine inspector and official of the Frick companies.

He rose to the presidency of the Frick companies in 1927, and in 1938 he was elected vice president of United States Steel Corporation in charge of raw materials. He retired from active duty on August 18, 1939, on reaching the corporation's retirement limit of 70 years. He remained in an advisory capacity, however, until his full retirement in 1946.

He assumes his new tasks at the age of 78.

Arnold A. Gustafson has been made operations assistant to the general superintendent at Freeport Sulphur Company's Grande Ecaille mine in Louisiana, General Manager Edmund D. Wingfield announced early in October.

A native of Duluth, Mr. Gustafson received his mining engineering degree at the University of Minnesota and was connected with various mining operations in Minnesota and Western United States before joining the Freeport organization in 1934. He has held several positions with Freeport, including superintendent of production at the Grande Ecaille mine and manager of an exploration office at Toronto, Canada.

V. A. Hensley has been named superintendent of the Weeksbury mine, an operation of the Coal Division, Eastern Gas and Fuel Associates. Until his new appointment, Hensley had been superintendent of the company's Midvale mine at Gamoca, W. Va. He succeeds H. S. McKalip who is retiring after 20 years with the company. His successor at Midvale is Myron Kok.

S. L. Mather, vice president in charge of operations, was retired on October 1, it was announced recently by E. B. Greene, chairman of the board of the Cleveland-Cliffs Iron Co., Cleveland, Ohio. Mr. Mather has been with the company for 42 years. He began his employment with the Cleveland-Cliffs Iron Co. after his graduation from Yale University in 1905 and was employed in the company's mining operations in Michigan and Minnesota until 1908 when he entered the Cleveland office and was elected assistant secretary of the company. He became secretary of the company in 1914 and has been a vice president since 1926.

Mr. Greene also announced the appointment of **Charles J. Stakel**, formerly manager of the mining department at Ishpeming, Mich., as general manager in charge of the mining department; the appointment of **Walter A. Sterling**, formerly assistant manager of the mining department at Hibbing, Minn., as manager of the Minnesota mines; the appointment of **C. W. Allen**, formerly assistant manager of the mining department at Ishpeming, as manager of the Michigan mines; and the appointment of **Fayette Brown, Jr.**, formerly assistant to Mr. S. L. Mather, as assistant manager of the mining department.

The technical staff of the Research & Development Division of Pittsburgh Consolidation Coal Company has been increased by the appointment of a research chemist and two chemical engineers. **Irving H. Welinsky**, originally of New York and recently of Wilmington, Del., has been appointed research chemist and assigned to general research for the division. **Jack F. Chapin**, formerly of Reading, Mass., has been appointed chemical engineer and assigned to operational work on the coal gasification pilot plant. **William E. Lough**, formerly of Morgantown, W. Va., has been appointed chemical engineer and will be employed on the coal gasification pilot plant.

L. G. Johnson of Baxter Springs, Kans., has retired as general superintendent of the Federal Mining and Smelting Co., in the Tri-State district.

Johnson completed 42½ years service—more than half of which was spent in the Tri-State—with the company and its parent affiliation, the American Smelting and Refining Company. He was succeeded by Ward C. Ball of Baxter Springs. Mr. and Mrs. Johnson will continue to make their home in Baxter Springs.

H. J. Rahilly, general superintendent of mines for the Anaconda Copper Mining Company since September, 1943, has been named manager of mines, succeeding **James J. Carrigan**,

H. J. Rahilly

Jas. J. Carrigan

who has retired due to ill health, it was announced early in October by E. S. McGlone, vice president in charge of Western operations for the Anaconda company. At the same time Mr. McGlone announced that **A. C. Bigley**, who has been assistant general

A. C. Bigley

Hale Strock

superintendent of mines since 1940, will succeed Mr. Rahilly, and **Hale Strock**, foreman of the Leonard mine since 1939, has been elevated to Mr. Bigley's former position.

All of the men involved in the staff changes are among the best-known in Western mining circles, and long have been successful in the Anaconda company's operating department.

H. J. Hager has been promoted by the Alabama By-Products Corp. to the position of assistant general superintendent of the company's operations in the Birmingham area. He was formerly superintendent of the Praco mine, operated by the same company. His successor is **R. T. Hill**, formerly superintendent of the company's Barney mine at Cordova.

Edward J. Yorke, Jr., has been transferred from the Dubois, Pa., office of the Coal Hill Mining Co. to become district manager of that company in Philadelphia. Mr. Yorke has established offices in the Real Estate Trust Building.

Louis S. Cates, who, for the past eighteen years has been President of Phelps Dodge Corporation, was elected chairman of the board on October 9.

The new President is **Robert G. Page**, formerly general counsel of the company and a partner in the law firm of Debevoise, Plimpton and Page.

Mr. Cates will continue as chief executive officer of Phelps Dodge.

Mr. Page, the new president, graduated from Yale University in 1922 and from Harvard Law School in 1925. During the next year he was secretary to the late U. S. Supreme Court Justice Brandeis. Mr. Page was the first New York regional administrator of the Securities and Exchange Commission. In 1935 he became a partner in the law firm of Debevoise, Stevenson, Plimpton and Page. For some months in 1940, Mr. Page was a special assistant to the Under Secretary of the Navy on aircraft plant expansion and procurement, and for a short period in 1943 he was a special assistant in the Army Air Corps.

T. A. Day of Pittsburgh, has joined the staff of the Bituminous Coal Institute, it was announced recently by Ralph C. Mulligan, director of public relations of this affiliate of the National Coal Association in Washington.

Mr. Day comes to the Bituminous Coal Institute after two and a half years with Bituminous Coal Research, Inc., in Pittsburgh.

Messrs. Lucien Eaton and **Fred G. Koper** of Pierce Management, Inc., left for Turkey by air on October 18th to study iron, chrome and copper mining operations in that country.

Allan H. Anderson has been appointed manager of the American Potash and Chemical Corporation, Trona, Calif., to succeed Walter J. Metzger, resigned. Anderson joined the staff of American Potash and Chemical in 1923 as a research chemist. He later served as general foreman and production manager and since 1946 as assistant manager.

Vernon E. Platt, veteran of over 25 years' service with the M. A. Hanna Company, has been appointed Western anthracite sales agent of the company and will hereafter make his headquarters in the Walbridge Building in Buffalo, N. Y.

Robert M. Weidenhammer, Chief, Metals and Machinery Section, Department of Commerce, was one of the two delegates to the meetings of the Iron and Steel and Metal Trade Committees of the International Labor Organization at Stockholm, Sweden, August 19-September 13. He was made chairman of a permanent group to work out the international standardization of statistics of the iron and steel industries.

John M. Johnston, Vice President in charge of the Zeigler Operations, of Bell & Zoller Coal & Mining Co., has resigned due to ill health. Mr. Johnston, who is a graduate of Pennsylvania State College, has been associated with Bell & Zoller since July, 1929, coming to the company as Chief Engineer from the Keystone Coal & Coke Company, Greensburg, Pa.

J. T. Claiborne, Jr., formerly vice president of Freeport Sulphur Company, has become a general partner in the firm of J. H. Whitney and Company, it was announced in October. J. H. Whitney and Company is a private firm engaged in the investment of venture capital.

— *Obituaries* —

Frank Armstrong, for 20 years a managing partner in the firm of Pickands, Mather & Co., and prominent in the coal, iron and steel and the lake marine trade, died in September at his summer home. His death followed a heart ailment.

The firm in which Mr. Armstrong was a partner is one of Cleveland's foremost operators in iron ore, coal and docks and has important interests in allied industries. Mr. Armstrong was a partner from 1923 until his retirement from active business in 1943.

Death on October 8 in Silver City, N. Mex., claimed one of the last freighters of 50 years ago, **Rhinehart Menges**, aged 80. For 20 years he operated one of the largest eight-horse freight outfits between Silver City and Mogollon, N. Mex., in the boom days of Mogollon, over a tortuous 80-mile mountain road, hauling machinery and supplies to the gold-silver camp.

Joseph E. Curry, one of the organizers of Apache Powder Company in Arizona, died at his home in Los Angeles on September 20. Burial services were held in Tucson, Ariz. Curry was employed for several years as chief clerk of the old Copper Queen Mining Company in Bisbee, and later in Nacozari, Sonora, as storekeeper and general office manager for mining interests. He returned to the United States in 1900 and entered the mercantile business in Naco, Ariz. Curry participated in the early development of properties in the Bisbee and Ajo districts and for many years was an official of Calumet and Arizona Mining Company and New Cornelia Copper Company. In 1920 he associated himself with Charles E. Mills in the organization and development of the Apache Powder Company of Benson, Ariz., and served as secretary and treasurer of that company. He later moved to Los Angeles as general manager, a position he held until his retirement three years ago.

Duncan Cruickshanks Kennedy, 74, of Kernersville Road, Winston-Salem, retired executive secretary of the Kanawha Coal Operators Association of Charleston, W. Va., died recently at his home. Mr. Kennedy had been in ill health since last January.

Mr. Kennedy was born in Drenfermline, Scotland, in 1873. Prominently identified with the coal mining industry, he was sent to Geneva, Switzerland, in 1939 by the U. S. Government to represent coal operators of this country at an international conference on labor relations.

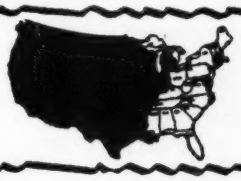
Herman H. Heyne, 60, for 10 years chief chemist at Mogollon, Catron County, N. Mex., of the Black Hawk Consolidated Mines Company, and for the past three years an engineer on the staff of the American Smelting and Refining Company at Vanadium, Grant County, died August 19, at the Chino hospital at Santa Rita. He was born in Germany, where he received his technical education.

Floyd E. Watson, 41, Fort Worth, Tex., former Salt Lake City district sales manager for Colorado Fuel & Iron Co., died of a heart ailment October 9.

Mr. Watson had been with the steel company many years and was assigned to the Salt Lake territory in 1941, serving as manager until June, 1947, then he was transferred to Denver as manager of wire products sales. On September 26 of this year he was promoted to sales manager of the California Wire Cloth Corp., a subsidiary of the Colorado Fuel & Iron Co.

NEWS and VIEWS

Eastern States



Predicts Low-Cost Synthetic Gas and Oil

Dr. A. R. Powell, associate director of research, Koppers Co., predicted recently at the American Chemical Society's 112th national meeting, that low-cost synthetic gasoline and oil will be manufactured on a large scale in America within the next decade.

"It now appears likely that the synthesis of liquid fuels will prove to be one of the major technical developments in this country during the next decade," he said and added that the search for inexpensive synthetic substitutes made from coal, natural gas and other materials is being pushed aggressively already and "will swell to a crescendo within the next few years."

At the same symposium Dr. C. C. Wright of Pennsylvania State College and R. F. Mitchell of the Consolidated Mining and Smelting Co. of Canada, stated that waste materials rich in carbon may be a cheap source of synthetic gas. High carbon content refuse can be converted by a stream of oxygen and steam to synthesis gas.

Dr. Wright and Mr. Mitchell also gave results of the operation of a synthesis gas producer using oxygen with rice and barley anthracite, and coke. These data were obtained in the Trail, British Columbia, tests.

L. E. YOUNG
Consulting Engineer
Mine Mechanization
Mine Management
Oliver Building Pittsburgh, Pa.

Carolina Coal Mine to Reopen

An enterprise that may mean the beginning of a broad industrial development in the Sanford-Pittsboro area of Piedmont, N. C., has begun with the newly formed Raleigh Mining Corporation tearing out old equipment at the entrance of Deep River coal field and making way for new. The corporation, an off-shoot of one of the nation's biggest mine operators, and owned by Walter A. Bledsoe & Co. of Terre Haute, Ind., made it known that the 1,000-ft. long slope which runs nearly 400 ft. under Chatham County, will be completely restored.

Plans reveal that the walls, floors and ceiling will be widened to increase the 28-ft. square hole to 80 sq. ft. The present rotting wooden roof supports will be replaced with steel and an armored steel liner will also be used to keep the tunnel free of water. The present equipment of the mine remains from former unsuccessful attempts on the part of Carolina Coal Mining Co., which sunk the hole in 1921, and Coal Products, Inc., which moved here in 1941 leaving in 1944.

Owner of four mines in Pennsylvania, John S. Marshall, vice president and treasurer of the new corporation, plans to remain on the ground as resident manager until the Carolina slope is producing a quota of at least 1,400 tons a day.

Flood Prevention in the Anthracite Area

Unless the mine water problem is solved, one of the nation's largest industries faces extinction, mine operator members of the Anthracite Advisory Committee declared at a recent conference with Department of the Interior officials. The solution can come only from an over-all mine flood-prevention effort coordinated by the Federal Government, it was stated.

Immediate attention of the Department to this and other problems raised was pledged by Secretary of the Interior J. A. Krug, who attended the meeting held October 2, in the offices of James Boyd, new director of the Bureau of Mines, at Washington, D. C.

Members of the staff presented an outline of the broad anthracite research program of the Bureau of Mines—its achievements within the past year and its plan for the future, which center around a new $450,000 laboratory to be built at Schuylkill Haven, Pa.

The critical nature of the mine-flooding problem, involving a steady encroachment of high water upon the anthracite region, was reemphasized in a report made at the conference on the results of a Bureau investigation. Bureau engineers, surveying the magnitude of this threat to the industry, found more than 100 billion gallons of water impounded in 115 pools in the anthracite district—more than five times as many pools and ten times as much water as were thought to be present when the investigation was undertaken. Committee members said that in some mines 20 to 30 tons of water are pumped out for every ton of coal extracted. They cited examples of other mines being closed by high water and never reopened, resulting in losses of natural resources and employment together with disruptions in the region's economy. Although some companies are working jointly to keep their mines dewatered, the problem never will be solved individually or by

SECO VIBRATING SCREENS

The top illustration may seem a little exaggerated, but there's no exaggeration in the statement that "dead areas" just can't exist on the screening surface of a Seco. No wonder then, operators everywhere (live wires themselves) choose Seco vibrating screens for screening more tons per hour . . . every hour . . . month after month . . . year after year . . . with little or no maintenance. Investigate Seco advantages today. Write for "A Guide to Better Screening." Dept. W

TRUE CIRCULAR MOTION VIBRATING SCREENS

SECO

SCREEN EQUIPMENT COMPANY, INC.
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto

small groups working together, they contended, in calling for a single overall effort.

Summarizing the work of the Bureau's Anthracite Flood-Prevention Section during the past year, S. H. Ash, chief of the Safety Division, said that the engineers investigated backfilling methods and subsidence at numerous mines and places, conducted an acid-mine-water survey, compiled information on barrier pillars, and examined the status of anthracite reserves in a representative area of the Northern field as they relate to the mine-water problem. In addition, to permit completion of detailed maps, they collected information on underground water pools in the Northern, Eastern Middle, Western Middle, and Southern fields and also compiled data on more than 5,000 bore-holes drilled by the various mining companies in the "buried valley" of the Susquehanna River.

Sharon Steel Purchases Coal Mine

Sharon Steel Corp., has bought the Carpentertown Coal and Coke Co., western Pennsylvania coal and beehive coke producer, it was recently announced.

The purchase gives Sharon Steel better control of a coke supply for its Youngstown district blast furnaces pending completion of a by-products coke plant at the Sharon works.

Sharon, it is understood, bought half the capital stock of the Carpentertown company from Uniontown holders about a year ago. Now it has bought the second 50 per cent of the stock for $213,025.

The Carpentertown plant consists of a coal mine and 300 beehive coke ovens.

More Coke Ovens for Clairton

Carnegie-Illinois Steel Corp, a U. S. Steel Corp. subsidiary, has awarded a contract to the Koppers Co., Inc., for construction of a new battery of 85 by-product coke ovens and the rebuilding of a 61-oven battery at its plant at Clairton, Pa.

This project which follows the rebuilding of two other batteries, is part of the U. S. Steel's post-war modernization and expansion program.

Work will start immediately on the 85-ton battery. Plant officials expect it to be completed by November, 1948. The rebuilding of the battery will start next year and should be completed in about 14 months.

The contract with Koppers also provides for building coal and coke handling equipment, machinery and auxiliary equipment of the most modern design.

The new battery at Clairton, already

the largest coke producer in the world, will bring the number of ovens to 1,567. Coal carbonization will be increased by approximately 1,500 tons a day when it is completed.

Big Sandy Coal Institute Sponsors Meeting

Late in September the Big Sandy Coal Mining Institute sponsored what is presumed to be the first meeting of its kind when all male high school seniors of Johnson, Floyd, Pike and Letcher Counties were the guests of the Institute for an all-day session at the Mayo State Vocational School, Paintsville, Ky. The purpose of the meeting was to present to the boys, through the medium of speakers and motion pictures, a picture of the mining industry, its place in the national economy and its importance to the welfare of mankind.

Some of the boys traveled as far as 75 miles to the meeting and were transported by busses, which were furnished by the various school authorities. The total attendance, including seniors and guests, was over 250. The meeting was an outdoor affair, except for the movies, which were shown in the school auditorium.

As the boys entered the meeting grounds they were registered and presented with pertinent literature, furnished by the National Coal Association. A tour of the Mayo School followed and the first speaker was presented by President M. M. McCormack. Daniel J. Jones, Kentucky state geologist, traced the origin and development of the coal beds of Kentucky from the depositing of the vegetable matter progressively through the various stages to coal, as it is known today. M. D. Cooper, vocational director, National Coal Association, spoke on "The Uses of Coal," and made an interesting story of this subject. Carel Robinson, of the Robinson and Robinson Engineering Co., Charleston, W. Va., painted a picture for the boys, of the old days of mining and of the type of worker required by modern mining equipment.

Following a luncheon for all boys and guests, given by the Big Sandy Coal Operators Association, and an hour of pictures of underground operations, shown through the courtesy of Goodman and Jeffrey Manufacturing Companies, the boys reassembled and heard D. Harrington, U. S. Bureau of Mines, cite the need for health and safety in the coal mining industry. He traced the history of safety in mining and praised the advances made. He condemned the alarmist attitude of many speakers and publications concerning conditions prevailing in the mines of the country. Professor C. S. Carter, University of Kentucky, spoke on the need of trained men in the coal industry.

Steel IS Cheap!

For The Price of a Soft Drink—

You can buy at retail across the counter a ⅜" x 6" Carriage Bolt and Nut.

At a nickel apiece, ⅜" x 6" Carriage Bolts cost $460 per ton. But a few Bolts and Nuts will hold a whale of a lot of things together and the price adds very little to the cost of those things.

Bolts and Nuts are made from special, cold heading quality, Hot Rolled Rods sold by the steel industry today at approximately $69 per ton. This illustrates that the price of steel as obtained by the mills has little effect on the ultimate cost to the consumer of most all finished steel products.

Last year, 22 of the largest steel companies, representing 88% of the capacity of the country, earned less than $5 per ton on their production. If rods had sold for $5 per ton less, sacrificing all profit to the industry, it would have affected the ultimate price of ⅜" x 6" Carriage Bolts by approximately 1%. STEEL IS CHEAP.

Cheap, too, is the ⅜" x 6" Bolt. Finishing it from a Rod by efficient production methods requires 26 separate operations on modern equipment worth millions of dollars. Grinding media also require many finishing operations. It would require a drastic change in the basic price of steel to affect the cost per ton of grinding ore.

TRADEMARK REG.

MOLY-COP

COPPER-MOLYBDENUM-ALLOY

Grinding Balls

SHEFFIELD STEEL CORPORATION

HOUSTON — Carbon and Alloy Steel, Ingots, Blooms, Billets, Plates, Sheets, Merchant Bars, Steel Joists, Structural Shapes, Road Guard Reinforcing Bars

KANSAS CITY — Welded Wire Mesh, Wire Products, Wire Rods, Fence, Spring Wire, Nails, Rivets, Grinding Media, Forgings, Track Spikes, Bolt and Nut Products

TULSA

SHEFFIELD STEEL

SALES OFFICE: Chicago, Ill.; St. Louis, Mo.; Des Moines, Ia.; Wichita, Kans.; Denver, Colorado; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; New Orleans, La.

BCR Plans Research for Mining Machine

At a breakfast discussion held recently by Bituminous Coal Research, Inc., which was attended by outstanding coal operators of the nation in Chicago is expected to result in one of the most important mechanical advances in the coal industry, a machine that will mine and load coal continuously and at low cost.

Reduced production costs will be reflected in lower costs to the ultimate consumer of coal. A program to develop the machine is to be financed by producers, coal land companies and railroads through the national research agency of the bituminous coal industry.

The temporary steering committee formed to organize the research, headed by H. N. Eavenson of Pittsburgh, has described the machine required by the bituminous coal industry as one which will operate in seams as low as 28 in. in thickness. A quarter-million-dollar program to activate the project is more than 71 per cent subscribed.

Hanna Takes Over Susquehanna Collieries

Effective October 1, Susquehanna Collieries Co. was absorbed by the M. A. Hanna Co. The name has been changed to the Susquehanna Collieries Division of M. A. Hanna Co. Operations and personnel of Susquehanna Collieries Co. will remain the same. The M. A. Hanna Co. will handle direct all sales of the Susquehanna as heretofore.

Fletcher Discusses Occupational Disease Compensation

On October 3 at the Sixth Saranac Symposium, Saranac Lake, N. Y., Andrew Fletcher, president of the St. Joseph Lead Company discussed "the management viewpoint on compensation and pulmonary and occupational diseases."

Opening his remarks by stating that the problems of management vary in each industry, Mr. Fletcher then discussed compensation laws, including some of the various provisions that exist in the 48 states and the difficulty of securing uniformity from the employer's standpoint. He added that he was certain that some day industry would have the benefit of a uniform compensation law, and presented practical suggestions with this aim in view. Mr. Fletcher felt that compensation for accidents was the simplest phase of the problem.

He also recommended that all companies keep absenteeism figures and find out just how much time is lost from work. He quoted the records for the S. E. Missouri Division of the St. Joseph Lead Company and concluded with the following remarks:

"In my opinion, management should urge states and unions to be very cautious in setting up sickness and welfare funds. Do not let us try to control the life of an individual from the cradle to the grave by various funds, etc.—most individuals will take care of themselves, especially if they are forced to. Let us pay industrial wages directly and not indirectly by setting up funds. However, when funds are set up, then industry should aid in their proper administration. I was very pleased to hear that Dr. Sayers will be the medical director for the very large fund that has been built by the coal industry. Under Dr. Sayers' direction there is at least a fair chance that the fund will be properly handled for the best interests of the contributors—the employes, the employers and the consumers of coal, who are now paying a higher price per ton.

"Provided management, unions, compensation boards, medical committees and everyone connected with the compensation situation work together, and with confidence in one another's integrity, I am sure that all of the problems which we are now facing will be readily solved. The solution of such problems makes our country greater and insures a continuation of the American way of life."

Vice President James Prendergast of the M. A. Hanna Co. (left, third from bottom), and a group of executives and customers set out for a trip underground at the company's Marysville mine at Shamokin, Pa.

Coal Mining Classes Starting

Two different courses in anthracite mining have started in the Pennsylvania anthracite region. The first one, the Penn State coal mining class, opened early in October in the Wyoming High School. It will be the first year of a three-year course. The class, sponsored by Wyoming school district, will be taught by Warren L. Shirey of Hudson Coal Co. The course is free to all men employed in the mining industry.

Central States

Electrolytic Zinc Plant Resumes Operations

The Monsanto, Ill., plant of the American Zinc, Lead and Smelting Company, which had been idle for almost a month because of cessation of power, is back in operation, an official of the company stated October 15.

The plant had shut down around September 17 as a result of the sustained spell of hot weather which had reduced the water supply of the Lake of the Ozark, Mo., with the result that the hydroelectric waterflow had been cut off. Since then, the water supply has been replenished to some extent and this has now made it possible for the plant to resume operations. It was reported that by the end of the year the 80,000 kilowatt steam unit will probably be ready at the plant of the Union Electric Company so that the plant will not be solely dependent upon the water supply.

Dewatering of Tri-State Mines

The Galena Mining Company has taken over the operation of the Eagle-Picher Murphy open-pit mine in the Short creek bottoms, northwest of Galena, and have the property nearly dewatered.

The company, operated by Fred J. Childress and Sons, Harold and W. Leon, has been operating several pumps, with a capacity of about 2,500 gallons a minute for several weeks. The water will be lowered to a depth of 80 ft., where the Eagle-Picher Mining and Smelting Company formerly carried on operations until the expiration of the premium price plan.

While the open-pit mine is being dewatered the Galena company is removing from 15 to 20 ft. of overburden in the daylight development work. Two regular power shovels will be used in the pit when dewatered to load ore in trucks, which will convey it to a car-incline for loading into railroad cars for shipment to the Eagle-Picher Central mill near Cardin for treatment.

Childress & Sons, who also operated the Mahutska Mining Company in Oklahoma, are resuming operation at the Jeff City mine, according to the elder Childress. They also operate the Mark Twain Mining Company and the Vanatta lease in Kansas. The New Blue Mound mine of the Mark Twain company north of Picher in Kansas, which was shut down during the summer, will remain down for a while, but pumping operations are to be resumed at the Vanatta property, a few miles to the west with the arrival of pump equipment ordered some time ago.

Arkansas Property Reopened

The old Lucky Dog mine, a producer of zinc ore during the first World War, which is situated six miles east of St. Joe, Ark., is being reopened by a group composed of Dr. W. M. Owens of Mountain Home, Sam James of Yellville and R. M. Regenold of Armorel, Ark.

The property is expected to be producing in November, according to J. P. Medley, foreman. Operating as the Lucky Dog Mining Company, the group has a lease on 100 acres, on which the mine is located. The mining tract is owned by Fred Sanders and B. G. Lewallen, both of Marshall, and W. B. Headstream of Batesville.

A 200-ton Joplin type concentration plant is being built to handle ore, which will be mined by tunnels in the hill side at the mining location, Medley said. Some exploration work is being done by churn drill, he added.

Messcave Pumps Out Shaft

Messcave Mining Co. is dewatering the old Kursch-Savage mine on the Hubbard land at Badger, Kans., bordering Spring River, according to Charles A. Murray, one of the partners.

Iron Ore Fleet Will Attain Goal

The Great Lakes fleet will reach its goal of 78,000,000 tons of ore this season unless adverse weather conditions curtail shipments in the last two months, vessel operators reported.

Freighters have been loading an average of 2,300,000 tons weekly, but the carrying capacity of the fleet declined during October because of lower drafts necessitated by Government regulations. Drafts were further curtailed the first of November under the winter tonnage schedule.

Shipments up to the first of October totaled about 62,000,000 tons, leaving 16,000,000 tons to be hauled down the lakes for the balance of the month and in November. As several ore carriers will be sent to the docks before the end of November, all available boats will be pressed into service this month.

Illinois Mill Treating Fluorspar

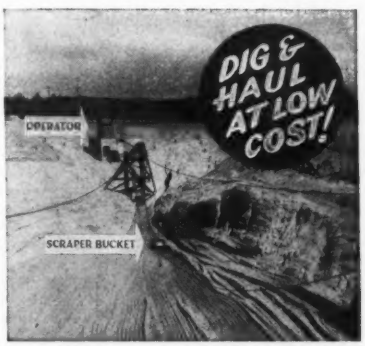
Operation of its new Western Knapp mobile mill, heavy media separation plant, was begun recently by Inland Steel Co., fluorspar division, at the company's Keystone mine in the Kentucky district near Salem. The new operation will beneficiate low-grade ore, increase reserves at the mine and eliminate an 18-mile ore haul to Inland's mill at Rosiclare.

Ore Research Laboratory Opened by J. & L.

Jones & Laughlin Steel Corporation has opened a new iron ore research laboratory in Negaunee, Mich.

The laboratory, which is adjacent to large undeveloped holdings of ore in the district, is equipped with facilities for investigation and pilot plant processing of J. & L. ores.

"The establishment of this laboratory on the Upper Peninsula of Michigan indicates a strong determination on the part of Jones & Laughlin to work out a continuous supply of domestic ore for its future operation,"



SAUERMAN SCRAPER DOES MORE WORK WITH LESS LABOR

DUE to their long reach and simplicity of operation, Sauerman Power Scrapers have an advantage over other types of material-handling equipment for many jobs.

With one of these machines you can haul material from the top of a hill or from a pond, river or deep pit to a loading hopper, or build a big stockpile and reclaim from the pile with the same machine.

Write for Catalog

SAUERMAN BROS., Inc.
540 S. Clinton St., CHICAGO 7

according to H. W. Graham, vice president and director of technology. He further stated:

"There are millions of tons of good quality ore in this country that require only minor adjustment in treatment to make an excellent blast furnace material, and it will be the function of this laboratory to explore these adjustments."

Stanley Mining Building Ore Plant

The Stanley Mining Co. is well advanced with the erection of a modern heavy-media concentrator at the Mary Ellen mine at Biwabik, Minn. The plant is another milestone in the progress of processing ore on the eastern Mesabi range.

The Mary Ellen mine was exhausted in 1928 when the Stanley Mining Co. ceased operations. Emmett Butler, it will be remembered, erected the first commercial jigging ore-treatment plant at the Mary Ellen mine on the Mesabi range, which was successfully operated between 1924 and 1938. Future plans at the Mary Ellen mine call for the treatment of a banded taconite formation in the upper cherty horizon by the heavy-media process and the production of iron ore concentrates. The venture marks another step in the advancement of iron ore recovery from the taconite formations of the Mesabi.

Loan Secured to Reopen Tri-State Mine

Clarence Zuvekas, Joplin business man, who emigrated from Greece when a young man, announced on September 13 that final papers had been signed for an RFC loan to develop the old Eagle-Picher Garrett mine lease, 3 miles north of Treece, Kans.

Approval of the loan, which was applied for through the Joplin RFC office in the Miners Bank Building, was based on test drilling done on the lease by Zuvekas and later by the U. S. Bureau of Mines. Zuvekas put down nine drill holes and the Mine Bureau five, which overall showed an average of from 5 to 6 per cent in metallic recover values of zinc and lead, he said.

In 1937, the Eagle-Picher Mining and Smelting Company started the sinking of a large shaft on the Garrett lease, which was finally completed to a depth of 435 ft. the following year. The shaft was sunk 6x9 ft. in the clear and two large turbine pumps—a 14-in. Pomona of 12 stages, with capacity of 2,500 gallons a minute, and a 10-in. Peerless of 16 stages, capable of handling around 1,500 gallons a minute, both powered by electric motors — were installed. The Halliburton Oil Well Cementing Company used 7,000 sacks of cement in grouting the area of the shaft, which aided in its sinking and the driving of a drift out southeast from the bottom of the shaft. The company finally abandoned the property and turned the lease back to the owner, after spending thousands of dollars in sinking the shaft and pumping operations.

York Iron Mining Liquidates

The York Iron Mining Co. has shipped its final iron ore from the York mine at Nashwauk, Minn., on the Mesabi iron range. The mine has become exhausted. Approximately 75,000 tons of ore concentrates have been shipped from the property this year. The mine has operated for 30 years. Herbert Grant is president of the company. He assumed that position following the death of the late George P. Tweed of Duluth a few years ago.

Parmanco
MECHANICAL FEED
HORIZONTAL DRILL
WITH TRACTION DRIVE

Ten years of field test has proven that our power-feed design of direct, transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminates costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS
WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

Tate E. Siebenthal is superintendent of the mine, having been with the company for the past 20 years. The York Iron Mining Co. is to be liquidated and all equipment and machinery will be sold.

Troy Mine Leased at Eveleth

Rhude & Fryberger has taken a lease on the Troy mine at Eveleth, Minn., Mesabi iron range, from the Mesabi Mineral Association and the Alworth Land Co., Duluth. Rhude & Fryberger has already moved in shovels and trucks to convert the Troy to an open-pit mine. This equipment has been transferred from an operation at Hibbing. The Troy mine last operated in 1916 as an underground mine. Rhude & Fryberger has also commenced on a contract to build yard railroad tracks at the Fraser iron mine, near Chisholm. The work will involve about 150,000 cubic yards of material.

Mines Building Dedicated

On October 9 at Hibbing, Minn., the new State Mines and Minerals Building was dedicated, with Governor Luther Youngdahl of Minnesota giving the principal address. The ceremonies were attended by a large gathering of State and mine officials and visitors. The Governor was introduced by Judge Martin Hughes, retired, who served as master of ceremonies.

The new building, of brick and steel construction with concrete foundation, will include a general engineering and office section, a research laboratory, a chemical laboratory, and a 10-car storage garage and repair shop. The thousands of drill samples that have been accumulated by the State over the last 50 years will be stored in the basement of the building. The building will occupy a site on an improved tract of land in Bennett Park which is donated to the State by the town of Hibbing.

Dr. B. S. Adams of Hibbing, outstanding civic leader, presided over the service during which the cornerstone was laid. A bronze casket was placed in the stone containing historical mining records.

To date over 250,000,000 tons of royalty iron ore have been produced from State-owned mines, and the present known remaining reserve of commercial ore is approximately 100,000,000 tons. In addition to this, the State owns over 10,000,000 tons of iron formation, or taconite, which may be developed in the future if taconite concentrates can be produced on a commercial basis. There are 14 taconite leases in effect at the present time which cover an area of 7,200 acres of State-owned land.

THE *Heart* OF PROTECTION PRODUCTION

A roof fall . . . a flash of flame . . . a trolley wire down! What happens next? Fire? Explosion? *And what about your production?* Do all your operating sections suffer, while trouble in just one section is cleared?

If a mine electrical distribution system is properly sectionalized with I-T-E Type KSC Automatic Reclosing Circuit Breakers, trouble in one section cannot stop service in others. Production levels are raised: time lost because of electrical disturbances is kept to a minimum, and safety to personnel and equipment is assured.

A rugged, completely dependable breaker, the KSC was developed especially for the mining industry. It is compact in construction and flexible in operation; it can be readily moved as mining progresses and centers of loads change. It is completely metal enclosed for safety and for prevention of unauthorized adjustments, yet is readily accessible for inspections and maintenance.

The KSC operates on circuits which can be fed in either direction, and it opens at first sign of short or overload—reclosing automatically on a return to normal line conditions. Voltages can be safely improved throughout the system by tying all feeders and trolleys into one network. Sections help one another by raising the diversity factor for the entire system, yet—with the KSC installed—shorts cannot be fed by distant substations, and substations are quickly separated when disturbances occur.

● *Increased production is just one of the many advantages to be gained by sectionalizing your electrical distribution system. The I-T-E representative in your locality will be glad to tell you of others, and to advise you on the proper applications of I-T-E Type KSC Automatic Reclosing Circuit Breakers to your mine. Use his service with no obligation.*

Be Production-wise . . . SECTIONALIZE

S-E-C-T-I-O-N-A-L-I-Z-I-N-G

SWITCHGEAR

The Leader In Technical Excellence

I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.
31 Offices in United States & Canada

SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS

Western States

Anaconda Plans Extensive Butte Development

Anaconda Copper will spend more than $20 million in the next five years on a new project to mine hitherto unprofitable low-grade copper ore. The company plans to ultimately mine and mill 15,000 tons a day of the ore. It expects to get at least 20 lbs. of copper for each ton of ore plus substantial returns of precious metals, such as gold and silver.

This was announced at Butte, Mont., during September by C. F. Kelley, chairman of Anaconda, at a banquet in his honor. Mr. Kelley termed the new work "the greater Butte project." He said the company had done extensive experimental work and exploration and had sampled more than 110,000 tons of the low-grade ore. These explorations assure at least 130 million tons of ore are available above 3,400 ft. underground. Total copper recovery is expected to be 2.6 billion pounds.

Some of the old shafts at Butte may be on future caving ground

Mr. Kelley said also that large tonnages of ore with similar characteristics are known to be below the 3,400-ft. level.

He said there was probably many million more tons of low-grade ore in Butte hill, which may have commercial possibilities in the future.

The company has selected a site for a new shaft to mine the ores. It will be of large cross-section, lined with concrete and of fireproof design. An underground electric railroad will handle 100 tons of ore in each train.

The company's mill at Anaconda, Mont., near Butte, will be remodeled to treat the additional tonnage. Mr. Kelley said no problem arises in the smelting and refining of the product. By the end of the third year daily ore production will be 5,000 tons, and in the fourth year this will rise to 10,000 tons daily. By the end of the fifth year daily production will reach 15,000 tons of ore.

Ten million dollars will be spent on the project in the first two years.

Discussing current operations, Mr. Kelley said rich and extensive copper ore bodies have continued to be found in Butte Hill at all depths. Development on the 4,200-ft. level, deepest in the district, has exposed two high-grade ore veins. Known as the State and High Ore veins, the two are 2,000 ft. long and have the same high-grade deposits found at higher levels.

On the future of Anaconda in Butte, Mr. Kelley said:

"With the carefully estimated tonnages known to be available for the production of copper from low-grade ore, there is now the assurance of a longer period of activity than it has been possible to state positively at any preceding time. It is now possible to visualize many years of a more varied and flexible mining operation than in the past."

Arizona Has New Smelter

A secondary lead smelter, with a daily production of about 35 tons, has been placed in operation in Phoenix, by the newly organized Western Smelting and Refining Company. Two types of lead are manufactured by the company; one, a soft lead, widely used in the plumbing trade, and the other an antimonial lead used in the manufacture of storage batteries.

According to Sam Shapiro, president of the company, this is the only secondary lead smelter between Los Angeles and El Paso. He is employing 18 men in present operations and predicts that the refining of lead ore at his smelter may be undertaken in the near future.

The main source of supply for the smelter is broken-down storage batteries which are fed into the "sweating tube" of the smelter. When this process has drained off the major part of the lead, further processing in a reverberatory furnace prepares the metal for chemical treatment. After chemical treatment, the metal is cast in 25-lb. ingots.

Ore Find Near Goldfield

The importance of a new discovery of gold ore in work conducted by the Newmont Mining Company in the western section of the old camp of Goldfield, Nev., is not yet definitely established, but late results of this work have been reported as encouraging. No statement has been made as to the grade of the ore but it is understood that a few rich streaks have been located.

Elmer Burt, superintendent of the operation, is quoted as saying the vein was opened at a depth of 385 ft., some 2,000 ft. west of the old Florence shaft, and not far distant from the recently reconditioned Whiterock shaft; that drifts have been extended more than 100 ft. on ore, 3 to 5 ft. in width.

Although far removed from the formerly productive mines of the Goldfield district, some geologists offer the opinion that this ground may contain a less intensely fractured continuation than the rich ores that were extracted during the Goldfield boom. Some of the ore samples are said to be rich and there are reports of some high-assay values, but there is no information relative to the average value of ore exposed, or to the extent of the vein. The find is attracting wide interest among mining men in Nevada.

Colorado Company Increases Holdings

Gold Hill Mines Co., of which W. W. Moore of Aspen, is president, has added another property to its holdings. The Gold Hill Co. owns a large group of gold claims on Difficult Creek just to the south of Aspen, and a group of silver claims above Twin Lakes, over Independence Pass from Aspen. Now the company has secured the Wonder tunnel and large group of gold, silver, lead claims penetrated by this tunnel on Independence Mountain at Empire in Clear Creek County, Colo.

No. 5 tunnel of Tamarack and Custer mine

General view of the Tamarack and Custer operation

Idaho Mines Consolidate

Twelve Companies Combine in Coeur d'Alene. The Recent Consolidation of the Day Mining Interests Presages Increased Production from This Famous District

★

By HARRY INGALLS

The "Wallace Miner"

★

DAY controlled mining interests in the Coeur d'Alene district propose to consolidate the bulk of their holdings into one company to be known as Day Mines, Inc., capitalized for $5,000,000, divided into 5,000,000 shares of 10-cent par value non-assessable stock. The combined assets of the new company are estimated at $8,341,537, and the stockholders involved number 4,000.

Officers and directors of the new company are named as Henry L. Day, Wallace, president; Frank M. Rothrock, Spokane, and Paul B. Jessup, Wallace, vice-presidents; S. F. Heitfeld, Wallace, secretary-treasurer, and R. W. Anno, Wallace, assistant secretary-treasurer. In addition to the above, Eleanor Day Boyce, Wallace; Wray D. Farmin, Clarence I. Paulsen and F. Wallace Rothrock, all of Spokane, are named as directors.

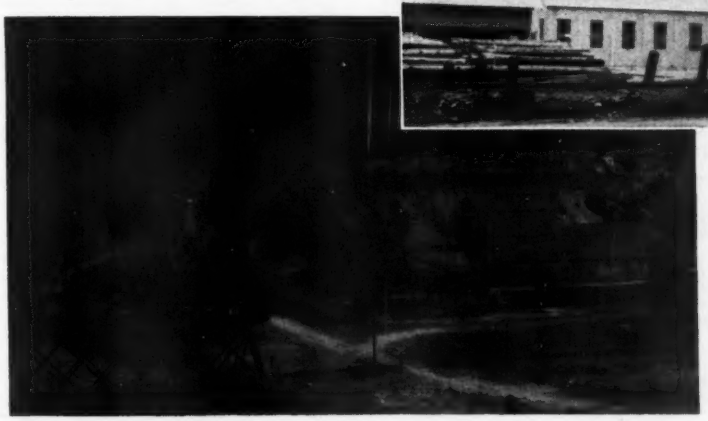
Twelve mining companies are involved in the combine, including three that are paying dividends, with record payments to date of $4,059,739. Stock in the new company is to be divided on a pro rata basis. For each 1,000 shares in the old companies stockholders will receive the shares in the new company.

The deal involves 800 patented mining claims, covering 10,000 acres and includes five concentrating mills with a combined capacity of 1,475 tons.

Lower Levels to Be Developed

Among the companies' mines the Tamarack & Custer is the oldest, with a dividend record of $2,842,143. Sherman Lead is next, with a record of $797,475. Dayrock is the youngest mine in the group, with a dividend record of $420,121. This mine has developed at shallow depth, 600 and 800 feet, what many mining men believe to be one of the major sized ore bodies of silver-lead discovered in the United States in recent years. The Hercules is the original mine of the Day interests and has a record dividend production of $21,543,622, but is not now in production. The rich ore bodies were believed to be

Above—The lower tunnel and milling plant of Dayrock mine



Left—The Hercules mill at Wallace has a 600-ton daily capacity

bottomed many years ago, but recent deep developments in the Coeur D'Alene district lead geologists to believe there may be a secondary enrichment in the Hercules vein system at greater depth. Therefore, the company is unwatering the mine and will prospect on lower levels.

The Monitor holdings include 162 patented mining claims in the Beaver district 10 miles north of Wallace. Six known mineral veins in this group are now in production. It is a zinc-lead development.

The King group consists of 154 patented claims in Lelande and Hunter districts and forms a connecting group extending from Burke to the old Snowstorm mine, northeast of Mullan, a distance of some 6 or 8 miles. A great deal of exploratory work has been done in this belt by now defunct mining companies and several important vein structures developed, but no commercial sized ore bodies found. The company is now opening the Copper King and National tunnels for further prospecting.

The only other mining consolidation in the Coeur D'Alene district that could be compared with the Day merger, happened in 1904 when Charles Sweeney organized the Federal Mining & Smelting company and purchased the Morning, Standard-Mammoth, Last Chance, Tiger-Poorman and Helena-Frisco mine groups, which have since paid dividends totaling $31,967,350.

Ore Transported by Helicopter

Transport of gold, silver and copper ore from mine operations by helicopter was initiated this September at a mine in mountain territory 26 miles northwest of North Bend, Wash. Heretofore, due to the rugged nature of the terrain, supplies have been carried out by packhorses. Carrying loads of 200 lbs., a helicopter piloted by Vern Montgomery of Central Helicopters, has been shuttling between the Bear Basin mine and North Bend, Wash., where trucks took over the load and transported the ore to the Tacoma smelters.

Dredge Operations to Start in Oregon

Fred Reel, construction engineer of the El Rio Dredging Co., of Los Angeles, announced recently at Grants Pass., Oreg., that his concern will engage in gold and platinum mining on a substantial scale in the Takilma area on the south fork of the Illinois River in Josephine County, Oreg. This concern is a subsidiary of the Stilwell-Reel Co., that operates largely in the Sutter Creek and Ione areas of California. In the Oregon area this September, Mr. Reel has unloaded pumps, suction dredges, a 40-ft. stacker, and other heavy equipment to initiate the new operations.

Progress Reported from Tintic Operation

Tintic Metals Company, controlled by Los Angeles, Calif., interests, has reopened the Little May shaft to a depth of 250 ft. The Little May is located in the southeastern end of the Tintic, Utah, mining district.

Old workings of the Little May, which is being operated under lease to Tintic Metals, have been reopened after a period of 27 years. Ores exposed thus far are low grade, but according to Louis Z. Johnson, geologist, who is in charge of the work, it will be possible to make some shipments from present showings.

The Tintic Metals Company also has a lease on the Tescora property adjoining and it is planned to explore upper workings of this property from the Little May shaft.

New Mill at Horn Silver Property

Metals Exploration Company of Los Angeles, Calif., is building a mill foundation at the Horn Silver property in Beaver County, Utah, which it is operating under lease. Meanwhile mining operations have been curtailed at the Horn property, pending completion of the milling plant.

Park City Tunnel at 1,700-Ft. Point

The tunnel being driven by the Newmont Exploration Company at the East Utah property, in the eastern end of the Park City mining region in Utah, reached the 1,700-ft. mark during October. The tunnel is now in diorite and so far no fissures have been cut, however, several should be intersected within the next 1,500 ft., with the main objective about 2,000 ft. from the present face of the tunnel.

Tintic Standard to Use Discovery Shaft

Tintic Standard Mining Company is transferring operations back to the old No. 1 discovery shaft, in the Tintic, Utah, mining district, after operating over 20 years through the No. 2 workings. Reason for this move is the expense of maintaining the old No. 2 workings after so many years of heavy production. There is understood to be considerable ore left in the vicinity of the No. 1 shaft, and this change will facilitate development of the adjoining Eureka Lilly holdings.

New Idria Continues Quicksilver Production

Substantial production of quicksilver continues from the great New Idria mine near Hollister, Calif. Manager C. Hyde Lewis reports that 90 men are employed and operations are proceeding steadily at mine and plant. The New Idria has been one of the foremost American producers of mercury for many years.

Magnesite Located Near Tonopah

Roscoe Wright recently reported discovery of a vein of magnesite, 2 to 10 ft. in width, and showing for a length of 1,600 ft., in the foothills of Lone Mountain, Nev., two miles southwest of the General Thomas mine, which was acquired recently by purchase from Esperalda County. Wright says the magnesite is of good grade and may have been mistaken years ago for quartz, since old prospect holes were found adjacent to the vein. Wright has submitted samples to a magnesite producing company and an engineer is expected to inspect the property shortly.

NOW install your own! Quick 2-Way Communication with

ARMY FIELD TELEPHONES

Performance equals present day commercial telephones up to 17 miles!

BATTLEFIELD PROVEN

EASY TO USE

CANVAS CASE

Now you can quickly establish *on-the-job 2-way communication* from office or temporary headquarters . . . on the surface or underground. Easy to install. Just hook up terminals to any two-strand wire up to four phones on same line if desired, without switchboard.

Operates on standard flashlight batteries. Compact . . . rugged . . . portable. Saves time. Promotes safety . . . efficiency. Every shipment includes free 50 ft. sample, new army field wire.

Write for FREE FOLDER!

NEW, *per pair*, complete with heavy canvas case **$29.50**
Leather—$32.50

USED, *per pair*, complete, either case **$19.50**

Compact, Portable Switchboards
for systems of 4 to 24 phones

NEW, **$125** RECONDITIONED, **$75**

All shipments F.O.B. Sacramento. No C.O.D.

Purchase orders accepted from firms with D. & B. rating

Extra Wire. New. 500 ft. $3.50; ½ mile reel, $10.50. 1 mile reel, $16.00.

Order by Mail! Send check or money order to:

LORIS SALES P. O. Box 1896, Dept. 4 SACRAMENTO, CALIF.

Wheels of Government

(*Continued from page* 48)

mation as to the existence of deposits of uranium, thorium or other fissionable source materials in the lands covered by his application."

Bureau of Land Management

A reorganization of the Bureau of Land Management in the Department of the Interior early in October has placed in three divisions the functions previously carried on by the Divisions of Homesteads, Indian Lands and Grazing, Reclamation and Land Grants, and Patents. The reorganized divisions and their acting heads are: Land Disposal: William O. Hancock, handles all disposal of land where Government parts with title; Land Use: Charles R. Drexilius, handles leases and granting permission to use public lands, including grazing leases, withdrawals and restorations; and Minerals: Lewis E. Hoffman, handles patenting of mineral lands and leasing of leasable minerals.

Pipe Line to Enable Arizona Mill Operation

The Cedar-Talisman Consolidated Mines Company, operating the French Lily mine and mill at Cleator, Ariz., is constructing a 12,000-ft. pipe line to supply water for milling operations. The company has purchased water rights from the Golden Turkey mine and it is believed that when completed the 2½-in. line will supply sufficient water to permit the French Lily mill to operate 24 hours daily, bringing operations up to full capacity of 60 tons of ore daily. J. Walters, Jr., is president of the company.

Gold Hunter Mine to Extend Workings

The Gold Hunter lead-silver mine at Mullan, Idaho, has been returned to the Gold Hunter Mining Company after having been under lease for 14 years to L. M. Norris and associates. Operations are being continued under company management with Mr. Norris in charge of operations, and C. K. Cartwright as general manager. The property has been opened to a depth of 1,200 ft. below the main haulage level and the leasers operated from the surface down to the 600 level. The company is now pumping out the mine to the 1,200 level with the intention to sink to deeper levels. The adjoining Morning mine has been in profitable production down as deep as the 4,850-ft. level, 750 ft. below sea level and 3,650 ft. below the deepest Hunter workings.

Bentonite Plant to Start in Wyoming

One of the new Wyoming industries is a million-dollar bentonite processing plant being built in the northeast corner of the state by the Baroid Sales Co. It replaces a plant burned down at Belle Fourche, S. Dak.

The plant is expected to start operations shortly with a capacity of 750 tons of bentonite a day.

The Black Hills bentonite plant at Moorcroft has been completed and it has shipped its first car of bentonite. Its capacity is 130 tons a day.

The bentonite industry is playing a great part in the new industrial development of Wyoming.

Program Announced for Northwest Mining Association

Taking over as the new managing secretary of the Northwest Mining Association in Spokane, Wash., Roger O. Oscarson has announced a busy program of Fall and Winter activities, of which the highlight will be a regional mining convention to be held in December. He also presented an extensive public relations program which he is planning for the mining industry in the Northwest.

Nevada Silver Property to Reopen

John F. Coleman, president of the Cortez Metals Company, owner of the old Cortez mine that embraces some 44 claims, and is credited with over $16,000,000 in metal production, was at the property recently and has announced plans for immediate production. The ore contains silver and some lead and zinc. The mine is located on the Eureka-Lander county line. A considerable area of the company's ground has already been under lease to a group of experienced mining men.

The Cortez mine was discovered by a Mexican in 1863, and was purchased by Simon Wenban, who constructed several San Francisco buildings with the fortune he took out of the mine.

Smelter to Add Scrap Plant

A scrap brass sampling and handling plant is being constructed by Phelps Dodge Corporation on a site near the company's Copper Queen smelter, at Douglas, Ariz., according to an announcement by Morris Fowler, superintendent. Foundations for a building 60 x 35 ft. are being prepared, and construction and installation of machinery is expected to be completed within three or four months.

In the new plant, copper will be melted out of many types of copper-bearing materials such as machine-shop borings and turnings, copper wire, rifle shells, automobile accessories and a variety of "junk." The sampling equipment will reduce one-tenth of each carload of scrap handled to 8 ozs. of pulverized material from which the metal content of each car can be computed.

The equipment required will include unloading machines, dump trucks, truck scales and sampling equipment. Operated in conjunction with the work at the smelter itself, the new operation is expected to require no increase in labor.

Arizona Mining Companies Merge

Directors of Tennessee Schuylkill Corporation, owners of the Tennessee mine at Chloride, Ariz., announce the approval of a plan to acquire control of the Arizona Magma mine through the merger of the company and Great Western Exploration Co. This will unite under one management, two of the best known properties in this district, the Tennessee mine, a lead-zinc producer and the Arizona Magma mine, the production of which has been principally in silver and gold.

The Arizona Magma mine has been undergoing a development campaign and it is believed that an orebody of considerable proportions, bearing high values in silver and gold, will soon be ready to mine. Production from the Arizona Magma will be milled at the Tennessee mill, which is three miles distant.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1947.

City of Washington,
District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared Bertha C. Wilkerson, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are:
Name of publisher, The American Mining Congress, Washington, D. C.
Editor, Julian W. Feiss, Washington, D. C.
Business manager, B. C. Wilkerson, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo.; Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

JULIAN D. CONOVER,
Editorial Director.

Sworn to and subscribed before me this 6th day of October, 1947.

KATHRYN A. HATHAWAY,
Notary Public.

(My commission expires July 31, 1952.)

MANUFACTURERS FORUM

Baker Announces Low-Seam Mine Tractor

The Baker Industrial Truck Division of The Baker-Raulang Company announces a permissible low-seam mine tractor for operation in seams as low as 30 in. This tractor, when coupled to various types of trailers, hauls coal, supplies or personnel. It has U. S. Bureau of Mines approval and is designed so that the operator

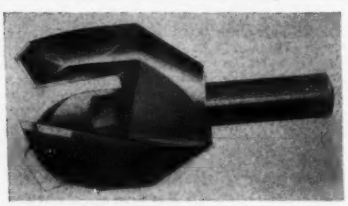
may work from either a sitting or reclining position to permit operation under limited headroom.

The tractor is used with trackless mining systems paralleling belt conveyors; eliminating the rehandling of materials and expediting the transportation of men. In this service, it draws a train of trailers, increasing carrying capacity in low-seams.

Further information can be obtained from the engineering representatives, J. H. Fletcher & Company, McCormick Bldg., Chicago, Illinois or J. H. Fletcher & Company, West Virginia Bldg., Huntington, W. Va.

New Drill Bit for Drilling Overburden

Kennametal Inc., Latrobe, Pa. announces the development of a new three prong drill bit for drilling overburden in strip mines. This new bit has a Kennametal cutting edge set at an angle which, it is claimed, enables it to cut through the rock encountered in overburden more effectively and to



drill at much faster speeds than the straight prong design.

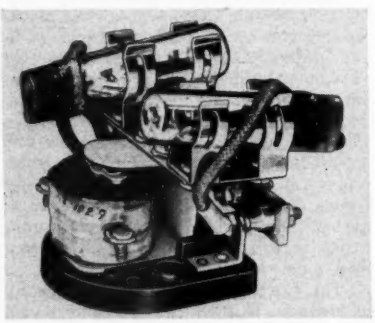
The prongs of the bit are turned to an angle to accelerate the cuttings away from the cutting edge as well as to keep the point of the Kennametal cutting edge more firmly into the material being drilled. Because the cuttings are accelerated away from the point, a more uniform hole can be drilled, and the machine can operate at lighter loads.

Advantages claimed for the bit include high compressive strength and resistance to shock resulting in longer footages per bit. Time-saving is effected through the elimination of removing and reinstalling sectional augers.

The bit is capable of drilling many hard materials—hard slate, hard shale, hard limestone, and even some sandrock at far faster rates of drilling than the steel bits used for the same purpose.

New Relay Offers Arc Protection

Developed and marketed by Potter & Brumfield Mfg. Co., Chicago, Ill., is a new mercury contact relay especially suited to current control in installations where there is danger of



fire or explosions due to ignition of fumes, dust or gas by arcs from open switches.

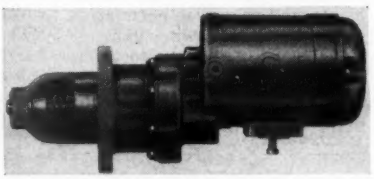
The new unit is sealed and completely arcless and can be supplied at extremely low cost. It is suited to motor-starting, heating unit and lighting applications in chemical laboratories, mines, refineries and the like where there is danger of arc-ignited explosions.

The relay is simple in design and its service-life is unlimited in that there is no wear whatsoever on the contacts. The coil is protected against moisture and high humidity by baked varnish coating. The relay can be supplied for voltages up to 440 AC or 230 DC—with all contact arrangements up to double-pole, double-throw, normally open or normally closed.

CP Air Starter

Mine operators are adopting a new method of starting Diesel Engines on mine locomotives. An Air Starter, made by the Chicago Pneumatic Tool Company, 6 East 44th Street, New York 17, New York, provides the means.

The starter is a 7 H.P. air motor



with a Bendix starting drive. A unit 18 in. long and 5½ in. in diameter, it is mounted on any Diesel by means of an SAE No. 2 flange. With a 30 to 40 gallon tank, charged beforehand from the mine's compressed air system, it is carried on the locomotive. This provides a sufficient supply of air to start the Diesel. This arrangement automatically meets all mine safety requirements.

The new type of starter is said to be one of the most reliable means yet devised of starting Diesels.

Gardner-Denver Company Opens Three New Branch Offices

Rapidly increasing demand for Gardner-Denver products has necessitated the opening of three new branch offices, to be located in New Orleans, Cleveland and Kansas City, Gardner-Denver officials announce. These new sales and service offices will bring the total of domestic branch offices to twenty-nine. The new branch office in New Orleans, at 1034 Camp Street, was opened on September 1, with M. B. Morrisette as branch manager.

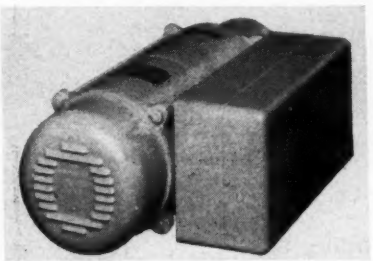
The new Cleveland office was opened October 1 at 8015 Carnegie Avenue with R. A. Williams as manager. The Kansas City office was opened at 2805 Main Street on October 15. E. C. Wallace will be branch manager.

A. C. Beeson, formerly manager of the branch in Detroit, has been called to the main offices in Quincy, Illinois, and the management of the Detroit office has been assigned to G. A. Murphy.

G.E. Announces New Electronic Amplidyne

A new electronic amplidyne consisting of a high-gain balanced d-c electronic amplifier and a motor amplidyne has been announced by the Motor Divisions of the General Electric Company. The new equipment is a high-capacity amplifier which is useful in many types of motor control where precise regulation of curernt, voltage, and speed is necessary.

Designed for use as a regulated ad-



justable-voltage power supply for d-c motors up to 1½ hp. and as a regulated exciter for larger adjustable-voltage drives up to 200 hp., the new equipment has an output of 1½ kw., 250 volts. It is arranged for use on either a 220- or 440-volt, 3-phase, 60-cycle power supply.

Design features include a completely balanced amplifier which is insensitive to line voltage changes; an industrial electronic amplifier with hinged panel which provides easy access to all parts and connections; a circuit which is easily adjusted for various operating conditions, and a locking device which maintains settings once the circuit has been adjusted. Double end ventilation is provided.

Additional information is given in Bulletin GEA 4889.

Eimco Announces Second Competition

The Second Annual Competition on the subject of "Mechanical Loading and Related Practices in Hard Rock Mining," has been announced by Eimco Corp. of Salt Lake City. The competition is open to any regularly enrolled senior, junior or graduate student who is a candidate for the degree of Engineering of Mines, Bachelor of Science, Master of Science or a Doctor's degree in the Department of Mining Engineering, at any accredited mining school in the United States or Canada.

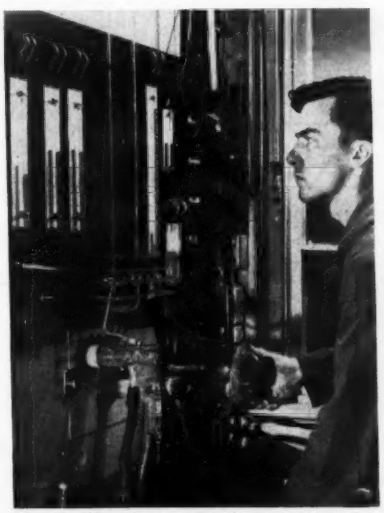
The purpose of the Competition is to gather information on mechanical loading from unbiased sources and to assemble such information into usable form. The Eimco Corp. has provided a fund from which awards can be made to adjudged winners of this Annual Competition. There will be three cash awards: the first, $500; second, $300; third, $200. There will also be Certificates of Merit awards, Honorable Mention, and Mentions.

Entries must be in the form of typewritten papers and should conform to accepted practices for engineering reports and technical treatises. All material for the Competition must be postmarked before July 1, 1948 and should be sent to The Eimco Corporation, Department S, P. O. Box 300, Salt Lake City 8, Utah.

High Efficiency Claimed for New Respirator

A respirator incorporating a new type of dust filter for protecting industrial workers exposed to poisonous and disease-producing dusts smaller in diameter than 24 millionths of an inch is announced by American Optical Company, Southbridge, Mass. It is claimed that the new filter, which consists of a felt that has been chemically treated, has the ability to prevent the passage of dust 40 times greater than is the case with untreated filters.

Approved by the U. S. Bureau of Mines, the new AO R-2000 respirator and filter is recommended for protection against toxic dusts such as: lead, cadmium, arsenic, and chromium; pneumoconiosis-producing dusts, free silica and asbestos, and the nuisance



Testing the efficiency of the new respirator

dusts, iron ore, coal, coke, aluminum, limestone, etc.

The filter is one-eighth of an inch thick and slightly over five square inches in area. Increased efficiency is accomplished without a proportionate increase in breathing resistance, thus making possible an approved respirator filter of small area. The container for the filter is therefore radically reduced in thickness, a feature which reduces the weight of the respirator and provides an increased field of vision in both vertical and horizontal directions for respirator wearers.

— *Announcements* —

Link-Belt Company announces the following changes in sales management personnel:

James B. Elliott, previously divisional manager for Caldwell plant products, with headquarters at the Caldwell plant in Chicago, has been appointed divisional sales manager at the company's plant in Minneapolis, Minn.

Erwin A. Wendell, formerly district sales manager, Chicago branch, with headquarters at the Pershing Road plant, has been appointed divisional sales manager for Caldwell plant products, with headquarters at the Caldwell plant.

T. W. Matchett, heretofore district sales engineer at New York, has been appointed district sales manager, Chicago branch, with headquarters at the Pershing Road plant.

* * *

The **Euclid Road Machinery Company** is pleased to announce the appointment of **W. A. Hoffman** as Sales Representative for the Canadian provinces of Ontario, Quebec, Manitoba and Saskatchewan.

At the present time, Mr. Hoffman resides in Noranda, Quebec, but expects to make his headquarters in Toronto in the near future.

* * *

B. H. Johns, for the past seven years manager of the St. Louis branch of **Independent Pneumatic Tool** Company, has been appointed manager of the company's mining and contractors tool sales division, with headquarters at Chicago, according to an announcement by W. A. Nugent, vice president. Mr. Johns has been a member of the Thor sales organization for 21 years.

W. B. Smith, former manager of the Houston branch, will succeed Mr. Johns as manager of the St. Louis branch, and **R. F. Caslin**, former Thor electric tool service engineer in the Houston territory, has been appointed to succeed Mr. Smith as Houston manager.

* * *

J. B. Templeton, president of **Templeton, Kenly & Company**, Chicago, manufacturers of Simplex Jacks, recently announced that **Haig C. Dilsizian, formerly** vice president of the company, has been appointed exclusive manager of Templeton, Kenly export business.

Mr. Dilsizian's organization, functioning as an independent unit, will continue to operate from the company's former offices in the Graybar Building, 420 Lexington Avenue, New York City.

E. A. Zimmerman has been assigned as Eastern District Sales Manager for domestic sales. His headquarters will also be at 420 Lexington Avenue, New York.

CORE DRILLING

ANYWHERE

We look into the earth

PENNSYLVANIA

DRILLING COMPANY

PITTSBURGH, PA.

ROBINSON

VENTILATING COMPANY

Fans and Blowers

Ventilating Engineering Service

ZELIENOPLE

PENNSYLVANIA

Established 1902

HOFFMAN BROS. DRILLING CO.

CONTRACTORS

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

Our specialty—Testing bituminous coal lands

Satisfactory cores guaranteed

UNIVERSAL SCREENS and UNIVIBE RIDDLES

Vibrating Screens and Vibratory Riddles, in many sizes and types, all priced most reasonably. . . . . Tried, Proved and Guaranteed Products. Leaders in Screening Field Since 1919.

Write for Catalog on Screens and Screening

Two Deck Model 42" x 96" Motor & V-rope Dr.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - - WISCONSIN

DIAMOND CORE DRILLING

CONTRACTORS

TESTING COAL AND ALL MINERAL PROPERTIES - USING OUR LIGHT GASOLINE DRILLS.. THEY SAVE FUEL AND MOVING COSTS..WE GUARANTEE SATISFACTORY AND PROPER CORES..

PRE-PRESSURE GROUTING FOR MINE SHAFTS... GROUND SOLIDIFICATION FOR WET MINE AREAS BY OUR STOP GROUT METHOD. WATER WELLS AND DISCHARGE HOLES DRILLED AND GROUTED... ELECTRIC DRILLS FOR INSIDE MINE DRILLING..

1200 FT. CAP. 2" DIAMETER CORE

MOTT CORE DRILLING CO.

HUNTINGTON, W. VA.

Index To Advertisers

	Page
Aluminum Co. of America	6-7
American Chain & Cable Co., Inc. American Cable Division	Third Cover
American Cyanamid Co.	30-31
Baker Mfg. Co.	32
Chicago Pneumatic Tool Co.	29
Edison, Inc., Thos. A.	5
Gardner-Denver Co.	14
General Electric Co.	10-11
Hoffman Bros. Drilling Co.	64
I-T-E Circuit Breaker Co.	57
Jeffrey Mfg. Co.	2-3
Joy Mfg. Co.	36-37
Kennametal, Inc.	4
Link-Belt Co.	12
Loris Sales	60
Mack Mfg. Corp.	Second Cover
Mine Safety Appliances Co.	Back Cover
Mott Core Drilling Co.	64
Paris Mfg. Co.	56
Pennsylvania Drilling Co.	64
Robinson Ventilating Co.	64
Sauerman Bros.	55
Screen Equipment Co., Inc.	52
Sheffield Steel Corp.	53
Standard of California	8
Union Pacific Railroad	13
Universal Vibrating Screen Co.	64
Worthington Pump & Machinery Corp.	9
Young, L. E.	51

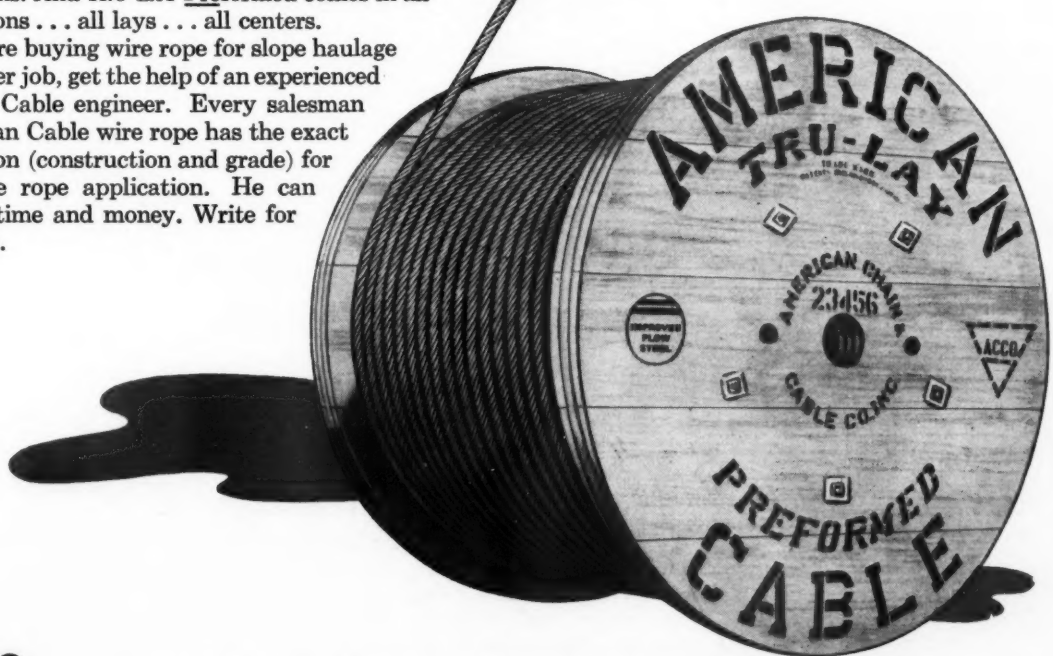
TRU-LAY Preformed for SLOPE HAULAGE

Slope haulage wire ropes whip, jerk and skid across rails, ties and the ground. Yet it is in just such service that TRU-LAY Preformed proves its ability to take punishment.

The wire rope for slope haulage is TRU-LAY Preformed in either I.P.S. or P.S. It gives better and longer service. It represents the proper combination of strength and toughness for the most grueling jobs. With this combination go long experienced engineering and thorough step-by-step inspections. And TRU-LAY Preformed comes in all constructions . . . all lays . . . all centers.

If you are buying wire rope for slope haulage or any other job, get the help of an experienced American Cable engineer. Every salesman of American Cable wire rope has the exact specification (construction and grade) for every wire rope application. He can save you time and money. Write for him today.

- **LASTS LONGER**
- **HANDLES EASIER**
- **LESS LIKELY TO KINK**
- **SPOOLS BETTER ON DRUM**



ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

the vital requirement:

dependably provided by EDISON ELECTRIC CAP LAMPS

for over thirty years . . .

The ever-increasing importance of *teamwork* in today's mining puts heavy emphasis on the *dependability* of production equipment, particularly the miner's personal cap lamp.

Light must not fail, for any member of a working group, if full production is to be maintained.

The EDISON Electric Cap Lamp provides unrivalled dependability for the wearer—unfailing, brilliantly effective light at the working place throughout the entire shift—and holds a more than thirty-year record of sterling performance. May we show you in a practical demonstration the reasons-why?

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada

MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED

TORONTO . . . MONTREAL . . . CALGARY . . . WINNIPEG . . . VANCOUVER . . . NEW GLASGOW, N. S.

SOUTH AMERICAN HEADQUARTERS MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.